RECORD

F. R. Foxberg

F. R. Fosberg

Collection and Field Note Book

No. 37

(October 11, 1953 - December 29, 1953)

(34925-35323)

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A BOORUM & PEASE PRODUCT

Oct. 11 – crossing s. w. part of state between Cumberland, Md. and Pittsburgh by air at about 17000' alt.

In the Valley and Ridge Province the flat valley lands stand out in a checkerboard pattern of cultivation, while the ridges are solidly wooded. The relief is not very obvious, but, with fall coloring an interesting pattern appears. The slopes are a rich russet (quercus rubra?) with the ridge-tops, the lateral ravines, and the base of the slopes green.

If some ground study were made, it might be possible to learn a great deal more about vegetation patterns by flying over in clear weather at this time of the year, & by using ~~colored~~ color film and photographing areas. This would probably be true in any deciduous forest region.

1953 Iowa + Nebraska

Oct. 11 - flying overland from Chicago to Denver - interesting to note the way the fields get gradually larger westward - also the perfectly rectangular, north-south, east-west pattern, marked out and determined by the roads on the section-lines. In Iowa trees are still abundant, mostly on gully walls and along streams, but in the eastern part even in woodlots.

The plain of the Missouri river cuts abruptly into the rolling and slightly broken country of eastern Iowa, leaving a striking broken escarpment of truncated ridges, the bluffs that give Council Bluffs its name. The Platte joins it from the west. This had little water, even here, and a broad sandy bed, strikingly braided. Up a short distance there is no water, except where

gravel pits have been dug in the bed - always near towns. In eastern Nebraska trees are still abundant along the actual stream beds. Westward they become much less so.

Where the Platte is crossed west of Aurora it is dry, sandy and only sparsely lined with trees. To the south of the river, in a slight upland, gullying is very striking, making dendritic patterns. Near Lexington, in bare dry gullied land is a string of reservoirs south of the river, connected by canals. There is no green whatever on their banks. They fill gully systems, which gives them a weird amoeboid outline. These are still in the Platte drainage. Gullies and creek beds have a sparse scattering of yellow trees here.

Further west, the gully systems become much more intricate and abundant on the headwaters of the north tributaries of

the Republican River. They are rather sharply etched in a level plain, but at times become so abundant that little of the plain is left. Trees have completely disappeared, except for a few in the rather broader bed of Red Willow Creek. This also has slightly greenish patches in its bed.

To the south the Republican river has been dammed to create the large Swanson Reservoir. Here all the level land has appeared to be cultivated. West of here large stretches are not quite so level, but somewhat rolling - and also not so severely gullied. These seem to show no sign at all of ever having been cultivated. No vegetation is evident, but they must be cattle range.

The "grain" of the country here and westward appears to run n.w. - s.e. even though in eastern Colorado the stream-beds

do not follow it so well. Here ~~too~~, in Colorado cultivation increases again, but with ~~pretty~~ very enormous fields. The gullies here are less sharply defined, not so deep or abundant.

Some water and some green vegetation though localized (probably fall wheat) appears east of the first large south branch of the South Platte. (possibly the main stream)

Oct. 14 - Tunlock, Calif.

Bermuda grass (Cynodon dactylon) has become very abundant on the home place. It is crowding out alfalfa in some spots and has cut down the yield of black-eye beans (Vigna sinensis [Cylindrica]). In the small patch which was formerly calf-pasture the spots where melons and cotton did very poorly years ago now show up in the beans. They are either absent or dwarfed and the bermuda grass which is 3-5 dm tall in the rest of the field is about 2 dm. there.

1953 ~~Calif~~ Haw. Is.
Johnston I.

Oct. 18 - Honolulu
Ridges above Kalihi
The lower ridges are covered by young casuarina which seems to have succumbed to the drought from a distance, at least, it appears to be all brown and dead. Should be checked

Oct. 20 - Johnston Island
Walked around the island except on the far side of the ~~island~~ runway from the installations. Island does not appear at all luxuriant, but except for the parts that are actually subject to heavy traffic, there is vegetation almost everywhere. Curiously enough, one man was seen weeding small enclosures at sides of paths into offices - an enlisted man, obviously detailed to the job.
Around buildings, etc. Eleusine indica, Chloris inflata, and Cenchrus echinata are commonest

plants. Boerhavia diffusa, Portulaca oleracea are common, Amaranthus viridis and Sonchus oleraceus less so.
Boerhavia forms a solid ground cover over some embankment. Over others Tribulus cistoides is very common but with Eragrostis virginicus and other grasses and Boerhavia.
Some of the cultivated species seem to be doing well, but the Araucaria trees noted in 1952 are almost dead - only two are left and they are a sick brownish green color.
Nicotiana glauca is planted all along the embankment between the housing area and the taxi strip. It is rather yellowish but flowering freely. Some Messerschmidia trees are 4-5 m. tall and 10-12 cm. thick near base.

1953 Johnston Island

Oct. 20 - Johnston I.
Disturbed ground,
coral sandy soil.

34925 Sporobolus virginicus (L) Kunth
1 are fair sized patch
near housing area

1 26 Vitex trifolia L.
planted around building

1 27 Acacia farnesiana L.
one bush, probably planted,
on embankment near taxi strip.

Plants seen

n. Schinus terebinthifolius (pl)
o Pluchea indica
o Messerschmidia argentea (pl)
o Terminalia catappa (pl.)
r Sesuvium portulacastrum
(flowers pink, stem green but
slightly reddish)
o ~~Cocos~~ Cocos nucifera (pl)
seedlings ex. 1 plant 3 m. tall)
r Cordia sebastena (pl.) (3 m)
r Pedilanthus tithymaloides (pl)
r Vernonia cinerea (dried sp.)
r-d Ricinus communis (pl.) (7 m. fr.)
Casuarina equisetifolia (pl.) (8 m)

spreading, forming
a thin mat.

two sprouts from one
root crown (nearby
plant 2.5 m. tall), flowers
lavender, degree of
dilation of corolla throat
and length of tube plus
throat, stamen length,
style length, all
variable in same inflorescence
bush 1 m. tall, not at
all luxuriant or healthy
looking.

o Thespesia populnea (pl.) (5 m., fr.)
c Nicotiana glauca (pl.)
r Brassaia actinophylla (pl) (chlor.)
r Araucaria sp. (Habout dead)
c Boerhavia diffusa
(uniform, white fls., no long hairs)
c Eleusine indica
c Portulaca oleracea
o Vitex trifolia (pl.) (4 m)
o Euphorbia hypericifolia
e.a. Canavalia edulis
c Ipomoea pes-caprae
o Cocculus nucifera (pl.) (fr.)
c Pluchea odorata
c Chloris inflata

o Amaranthus viridis
c Tribulus cistoides

1953 Wake Island

1+6
10-27

Oct. 22-23 - Peale Islet
Disturbed coral sand
and gravel

34928		Chloris inflata Link common locally along roadsides.	erect, spikes purple.
4	29	Cenchrus ~~viridis~~ brownii R+S. common locally	culms spreading to ascending.
2	30	Lepidium ~~o~~-waldense Cham. & Schlecht. very common only on steep banks around "Lake Peale"	plants erect
2	31	Cyprodon dactylon (L.) Pers. one patch near old sea-plane ramp	prostrate, forming a dense mat.
3	32	Paspalum vaginatum Sw. one patch on top of mound of sand on old Japanese installation	prostrate, forming mat.
3	33	Cyperus rotundi~~folius~~ us L. local near old seaplane ramp, rhizomes buried.	rhizomes bearing tubers.
2	34	Albugo platensis parasitic on both forms of Boerhavia diffusa.	infected branches of host condensed and erect, uninfected elongate, prostrate.
1	35	Cocc~~o~~loba uvifera L. rare in ~~scrub forest~~ Messerschmidia scrub.	clumps 2.5 m. tall, bearing large green fruits in racemes.
5	36	Digitaria ciliaris occasional small patches near seaplane ramp	plant of diffuse habit, rooting at nodes.
2	37	Abutilon indicum (L.) Sweet occasional ~~in forest~~ in open scrub	shrub 0.8 m. tall.

1953 Wake I.

Peale Islet

34938 Amaranthus dubius Mart.
2 occasional along road in scrub.

2 39 Euphorbia ~~thymifolia~~ prostrata Ait.
occasional in bare spots

8 40 Lepturus paparicensis Forb.
small colony of 40 or 50 clumps in open scrub near extreme west end.

2 41
2 42
2 43
2 44 Lepturus repens var septentrionalis
in open scrub ~~near~~ at extreme west end of island

3 45 Sida fallax Walp.
scattered in sparse scrub

Ost. 23 - Wake Islet
on coral sand and gravel in sparse scrub.

3 46 Boerhavia diffusa L.
common

3 47 Boerhavia ~~erecta~~ mutabilis R. Br.?
common

2 48 Cyperus rotundus L.
locally very abundant in open low pl

3 49 Paspalum vaginatum Sw.
locally abundant in open low places.

50 Lepturus repens var. septentrionalis Forb.
scattered along road

erect.

prostrate, purplish

clumps with ascending culms. (ind. mass collection of one fertile culm each from large number of plants - broken off about 3 dm. long, ind. mature and immature spikes)
small clumps

shrubs up to 1 m. tall, flowers clear orange, no red center; fruiting branch from different bush.

forming dense mats 1-2 m. across, stems red, flowers pink.

forming dense mats 1-2 m. across, stems green, flowers white.

culms erect, leaves prostrate.

forming a dense mat, fruiting culms erect.

tufts. Mass coll. of fruiting culms.

1953 Wake I.

Oct. 22-23 - Interviews with several people who were on Wake during Typhoon Olive, Sept. 1952, brought out the facts that:

On most parts of the atoll no waves went over the vegetated parts of the land.

That in several places, including the Terminal ~~[illegible]~~ water from the lagoon rose and covered the ground; in one place near the bridge on Peale I. sand was washed up over the road.

That all leaves were stripped from the trees, as well as some bark.

That this was largely done by flying gravel.

That within 15 days leaves had started to reappear.

That few trees were uprooted.

A great deal of flying gravel was observed but it stopped at once when water came up over an area.

Present condition of the vegetation, after an unusually wet season, is one of notable luxuriance, compared with 1952, but the trees present a much more ragged appearance with many dead branches, some tendency to lean and be partially broken in one direction or another (depending on the locality on the island). Or only a very few areas have many trees actually been uprooted, but enormous quantities of branches have been broken off and tend to make progress through the undergrowth slow and difficult. Tangled masses of wreckage, twisted iron, bent sheet-iron, etc. are also strewn through the brush.

Actually dead branches of trees are usually those that significant areas of bark have

1953 (Wake).

been stripped off of, or that have been broken. Messerschmidia and Pisonia trees have suffered most, some of the latter being blown down. Cordia apparently resisted the wind more effectively as relatively little dead wood is in evidence on it. The Cordia-Pisonia forest seems still to be quite intact, though some trees are blown down, especially Pisonia, which are generally taking root where they touch ground. The whole is quite tangled, choked with branches, etc.

The Messerschmidia forest is in most places still intact, but in a few areas, such as east of TAL compound and on the middle and east third of Peale Island, it presents a very battered appearance, most of the trees being broken. The trees near TAL compound that

were dead in 1952 are now practically gone.

Practically no dead trees of large Pemphis are left, but it is difficult to tell which were destroyed by the typhoon and which by clearing to make roads, etc.

The low bushy Pemphis at the east end of the lagoon was apparently killed back somewhat almost everywhere, but has largely recovered. Dead branches and tufts portions of plant, are very much in evidence.

The three patches of original forest that were still quite distinguishable in 1952 could not even be located this time. They apparently suffered more than the lower second-growth. Those near the east end of the lagoon may have been destroyed by clearing.

The Cordia forest near Pearce Point is much

1953 Wake).

greener and more luxuriant than before. The general effect of the typhoon in many places seems to have been to destroy or greatly inhibit the growth of young woody plants which were invading bare areas, so that many pioneer habitats have been maintained. This has encouraged a great spread and outstanding luxuriance of first stage pioneers like Cenchrus echinatus, C. brownei, Euphorbia heterophylla, Clausena indica, and Fimbristylis spathacea, and to a somewhat less extent, Catulaca oleracea (seems to be hybridizing with P. lutea) Digitaria (Trichachne) insularis, D. setigera sp., Euphorbia hypericifolia, etc.

Boerhavia diffusa Verbesina virgulata

A small but vigorous patches of Cynodon dactylon, Paspalum vaginatum, Cyperus rotundus, and Euphorbia prostrata

are found here and there. Gossypium is local but widespread, very uniform G. religiosum. Ipomoea pes-caprae, Catulaca lutea, Heliotropium anomalum, Vigna marina are about as common as before. Heliotropium seems to colonize actively the bare gravel flats and beaches on the west ends of Wilkes and Peale islets. Lepturus repens seems more widespread and common, but probably this may be because it is a much wetter season. Lepturus paspalinensis forms a colony of perhaps 40-50 clumps near west end of Peale).

The cultivated plants around the T+L compound are doing well - Ficus carica up to 1.5 m. tall and bearing fruit, Terminalia catappa 1.5 m. tall, healthy, Carica papaya, Cathaeanthus in good condition, Bauhinia sp. chlorotic and eaten by insects.

1953 Wake).

Capsicum (2 forms) in good condition and fruiting abundantly. Cantaloupes were growing well, flowering and fruiting around communication center, but were slightly chlorotic on exposed sides of building. These formerly had to be hand pollinated, but now are being visited by bees from a swarm recently brought in from Honolulu.

A resident reported that a single tomato plant had grown and fruited near the garbage dump.

Hibiscus hybrids and Casuarina are doing well at TAb. compound, Casuarina also at several other places. Cocounts being planted around all building areas.

Cinnamon sp. doing well at dispensary

CAA personnel, esp. B. H. Hall, Harrington, and Margaret Rosen, are much interested in

planting around buildings and are establishing an "arboretum and nursery" where they intend to start and grow plants. They have many cuttings, seedlings, etc. from Honolulu and Midway. Many potted plants, such as Hymenocallis littoralis, Coleus scutellarioides, Casuarina, etc. waiting to be planted out. Many of these things will probably do well enough during this ~~drought~~ wet spell, but may fail in a drought. They are being watered with brackish water, which is now rather fresh, but will be increasingly saline when weather is drier. Also, the wells are closely spaced, 6 or 8 in a row 50' or so apart. Seems that this is likely to result in pulling salt water up into the lens.

1953 (Wake).

Recently cleared areas come up to a thick Messerschmidia scrub rather promptly. The antenna-area of the Loran station must be cleared every month or so. Messerschmidia sprouts grow up to about 0.8 m. in that time. Then growth slows down, so they are 1-1.2 m. after 3 or 4 months. It is dragged with a steel I beam to break off the shoots.

Localities:

West end of Wilkes I. Messerschmidia scrub to top of beach, broad gravel beach colonized by Heliotropium anomalum down to h.t. level.

No Pisonia, Cordia or Scaevola seen on Wilkes I. Messerschmidia of low stature.

West end of Peale I. Broad flat of open Messerschmidia scrub. Broad beach thickly colonized by Heliotropium with some Messerschmidia

Lagoon beach of Peale I. from bridge lined by sod of Scaevium.

East side of Pisonia forest on Wake I. borders on a sort of low place with dense growth of Cyperus rotundus, patches of Paspalum vaginatum and Cyperus. Other grasses too - little scrub.

East end of lagoon - shore very gradually sloping, expanses of patches of low Pemphis.

Ponds east of lagoon beyond taxi strip - sandy bottom, soft parts above water covered by Scaevium portulacastrum, pink flowered. Low Pemphis around edges mostly dead and white a pale gray.

Bare rolled area at e. end of main runway - of packed coral. Seedlings of Portulaca oleracea.

1953 Wake

Fimbristylis spathacea, Cleusine indica, and Euphorbia prostrata locally abundant, the first two especially so, most often dominant but others locally so. A few scattered plants of Lesuerium and Messerschmidia, especially near seaward end.

Peacock Pt. — coarse gravel and cobble flat - apparently formerly covered by scattered Messerschmidia 2-3 m. tall. Upper branches now dead but thick branching from base up to 1.5 m. tall, luxuriant. Between these are scattered tiny bushes of Heliotropium anomalum. & no Scaevola bush seen here.

A few scattered Scaevola in brush south of runway, but seem rarer than in 1952. Gone from around terminal

The general vegetation is an open to closed scrubby woodland of Messerschmidia with luxuriant growth of weeds in all the spaces between — Cenchrus, Cleusine, Setaria, Euphorbia heterophylla, Boerhavia, and locally others as Tricachne, Digitaria, Euphorbia hypericifolia, etc.

Along south shore of Wake I. is a long stretch of beach rock, rather eroded, mostly coarse textured pebble-conglomerate but beds dipping seaward.

Typhoon Olive - Sept. 1952

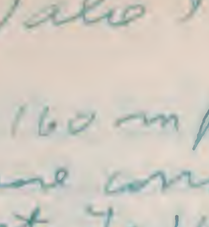
(High winds started from NNE moved around to N NNW, NW WNW (highest properly recorded wind at 10:35 velocity 85 mph, gusts to 110 mph. around 8 W. when one reading of 120 mph. gusts to 142, then around to W S W where maximum velocity but no records, estimated

1953 Wake I.

as high as 160 mph gusts to 180, more conservatively at 140 gusts to 160, then around to S where velocity dropped to 80 mph.

When winds were from north a few rather weak waves went up into land. When from west water piled into lagoon so it rained up and overflowed terminal area to one or two feet deep.

Though this was a severe typhoon Wake escaped severe wave damage because the center went north of island (in N. hemisph.) of right of motion. If it had passed just to south, in same direction forward motion would have been combined with maximum piling up velocities it hit Wake.



As it was, little or no topographic change resulted.

Birds:

Hundreds of frigate birds observed flying or roosting on old steel frame of power lines. Some brown boobies with them flying. A very few blue-faced boobies, also. Many common noddies roosting with them & flying with them. Terns (or Noals); ~~&~~ one nest with half grown young. A few Tattlers flying, especially around Pisonia trees. A small flock of Sterna fuscata near SE end of Peale I. NW end of Peale ~~is a~~ were a small group of almost fully grown but more or less crippled young ones. Here is said to be the new nesting site. Some dead young lie also. Nesting was over in July. Bird driven off old nesting place selected this. One tattler, one turnstone, several dozen plovers feeding in ponds, a few scattered elsewhere.

1953 Japan

Oct. 25 - Mitake

Canyon with steep sides. Them with planted forests of Cryptomeria, Thuja, Chamaecyparis, etc.

Forests harvested in sections, clean cut, and replanted. Cryptomeria most common.

Trees are cut when about pole size, perhaps 10" at base - 28 rings on two trees counted.

Bark carefully removed and baled up for use as thatch - most of thatch in region is of bark - used thin with bamboo bats, or very thick like straw thatch. All twigs etc. gathered up and used. Logs piled up on steep hills on horizontal and vertical log frames. Logging seems frequently to start from top of slope.

Cable car a funicular r. up mountain at top each little peak seems to have a temple. Trails connect them on ridges. Small gardens, groves of beautiful

clean large Cryptomeria trees - not as large as at Nikko, but some 2 m. thick, much straighter and in better condition than at Nikko.

Rhus ambigua seems equivalent to R. toxicodendron climbing, turning bright red at this season. Trees on lower slopes not changing color yet. Above getting rather bright. Rhus sp. furnishes much of color - seems almost exactly like R. vernix.

Oct. 30 - Maebashi to Numata - mulberries very abundant - belt trimmed down to 1-2 m. tall, trunks very low with 1-1.5 m. stretches.

Oct. 30 - Azuma Village near Kuruju Tunnel deciduous forest, well colored up, with patches of planted Cryptomeria, rather sparse, showing up dark green against bright fall colors of other trees.

1953 Japan

Oct. 30 - Katashinagawa R. valley - Fall coloring on sides very beautiful - mostly deciduous forest. Mulberry trees here are allowed to grow to small tree size.

Maize seen hanging up to dry at about every house - husks folded back and used to tie ears - Mostly orange kernels, but one or two places seen with blue and white.

Oct. 30 - Canyon of Katashinagawa R. above Takuma on way to Ozegahara

Canyon with narrow flat bottom and steep sides 2-300 m. high. Well wooded with beech - maple forest - beech dominant, some maple usually of lower stature, a few oaks of a chestnut oak type, locally common & large trees. Leaves mostly shed as of Oct. 30, but still attractive in ground layer about 1 m. tall mostly a broad-leafed sasa, but locally Taxus is dominant or common in this layer, presenting much the same appearance as T. canadensis in N.E. U.S. and

Ferns are common and of a number of genera. Upward in the valley the Taxus disappears up on the sides the maple practically drops out. The kara becomes very dense. The Fagus larger trees and widely spaced, a woodland rather than a forest type. Few young trees of any sort. The kara forms a solid layer 1-2 m. tall.

Farther up, young trees become more abundant, shrubs (Viburnum) also abundant, beach still dominant but Betula alba and a few conifers appear.

At top of Katamachi pass is a sparse woodland mostly Betula, with the usual kara layer, 1 m. tall and dense. Some Fagus.

1953 Japan

Oct. 30 - Canyon of Kawakami Gawa going down from Hatomachi toward Ozegehara Fagus again dominant with Sasa layer, with some birch. Going down conifers (Abies, Tsuga, Thuja?) appear and become common, in patches dominant.

On slopes of Mt. Shibutzugawa, west of this canyon, this forest goes up about half way. Then a broad band of what appears to be a low pine scrub (seen only for a distance). Above this is open grass of some sort.

In bottom of canyon, where gradient levels out and bottom broadens out, is a deciduous forest mainly of oak, with a birch with shaggy bark (as ind. Betula and esp. B. nigra), gray in color. The leaves are all shed. Still a well developed Sasa layer.

Oct. 31 - Ozegehara Moor

This is a valley surrounded by rounded but abrupt mountains - mostly pleistocene volcanoes. A flow from one of these, Hiuchigatake, in mid-pleistocene dammed up the valley at a narrow place, making a lake several miles long. This gradually filled up, evidently both by silting and peat-formation; until the lake is now replaced by a flat plain, mostly an enormous peat-bog.

The slopes surrounding the area are covered by what appears to be virgin forest. The lower slopes have mostly beech and birch, with some oak and larch. Upward this becomes mixed with conifers, but in most areas is a mixed conifer and broad-leaved forest clear to the top. On Mt. Shibutzugawa an almost pure coniferous forest comes down to the edge of the head of the bog, but this is unusual. Most conifers, however, are in

1953 Japan

the lower slopes generally near the head of the bay than farther down.

At this date these slopes are exquisitely beautiful, even though the main display of autumn color is over. The colors now are soft - silver-gray of the birch trunks, plum colors from their upper branchlets, soft rich brown of persistent beech leaves, contrasted with the dark green of the conifers, with outlines of the mountains softened and partly obscured by low hanging clouds. All is a subdued picture, changing with thinning and thickening of the clouds, and toned by haze. The general effect is plum-color and silver, trimmed by dark green. The rounded contours of the mountains and the mammilate masses of the tree crowns add to the effect. The closer slopes further show a background of ~~[illegible]~~ lighter green from the ground-layer of dwarf,

which is everywhere.

Contrasted with these slopes is the flat floor of the moor, straw-yellow at this season after a few hard frosts. This is traversed by winding bands of trees which line the stream-banks.

Alluvial fans are conspicuous at the mouths of all of the canyons, mostly wooded but some open and boggy or covered by reeds. These suggest the amount of the filling to be ascribed to deposition of silt and gravel.

The belts of wood along the streams ~~are~~ ~~[illegible]~~ in silty strips, usually below the level of the surrounding bog surface, varying in width according to the size of the streams. The streams meander within the strip of lower terrace, cutting it down still more. Here the trees are mainly birches and oaks, except in the

parts toward the head of the bog where Larch dominates. Beneath the trees are shrubs - Hydrangea Viburnum, etc., and in places solid stands of Sasa. Broad-leafed ferns are common, as well as many ferns - Botrychium, Dryopteris, Osmunda, etc. Osmunda cinnamomea is common, forming patches both in the wooded strips and in certain low spots outside them. In other low spots outside the wood, especially toward the valley head, Vernicia (Vernicastrum) is abundant. Rhododendron also may be found at the edges of the wood near the head.

The streams themselves have clay banks and gravel beds, often completely covered by Hippuris which has long fluffy stems trailing in the water from strongly-rooted bases.

The actual surface of the moor is flat to gently rolling - with a total relief of perhaps 3 m. This relief does not seem to follow any very well defined pattern. There are broad flat knolls a swells, equally broad shallow depressions, areas irregularly undulating.

This surface is generally covered by grass and sedges, mostly now too far gone to identify, but including a sod-forming Carex and a solitary tall Eriophorum of the E. polyphyllus affinity. There are abundant remains of Lycopodium, Hemerocallis, and several Liliaceae. Small shrubs of Ilex, Myrica gale, and Kalmia polifolia (?) are common but somewhat irregularly distributed.

Sphagnum and Cladonia are absent or almost so from the extreme headward

1957 Japan

parts of the moss, but Sphagnum soon appears downward, first as patches, then becoming a general important part of the vegetative cover, ~~several species~~ ~~as carpet~~ at least of the raised spots, basically everywhere. Several species are present, one the short deep red S. rubiginosum, another a slender green one. Sphagnum may well be the most important single genus in the bog. Cladonia becomes common near the lower end, but not abundant.

A Vaccinium (Oxycoccus) with rather large fruits and very long pedicels is general except in the uppermost parts, and in some very wet Sphagnum areas is very abundant. Few fruits left now.

Occasional stunted patches of Tsuga are to be seen, usually fairly near the sides

a near stream forest. Phragmites is in place very thinly scattered, often completely absent, occasionally forming dense bands a patches. Possibly both this and Tsuga indicate some silt, Phragmites in low spots, Tsuga in high.

Lycopodium obscurum common generally in bog, L. inundatum in wetter places.

This whole area is like an enormous sponge, completely saturated with water. Large patches are quaking bog, some very much so. Some are soft soupy mud pp much, which will not support one's weight. Trails soon become like this.

Perhaps the most interesting feature is an abundance of small irregular-shaped ponds, from one to 50 m. across, and of varying depths,

mostly 1-2 m. These ponds are irregularly distributed, occurring in any sort of situation in the actual boggy land (not in the finer ground along the streams), but most frequently on top of the swells or knolls. These knolls seem to be actual raised Sphagnum bogs, where upward growth exceeds decomposition and compression.

A striking thing about the ponds is ~~the~~ the variation in water-level of even adjacent ponds. Ponds even a few feet apart may differ in level as much as a meter. There is no apparently impervious barrier between them - merely waterlogged peat slopping from one to the other. Around the higher ones there is usually a definite rim which has more luxuriant vegetation than around the low-lying ones. The water is apparently merely retarded from seeping from the higher to the lower by friction of

the peaty material. There is no way of estimating actual flow but most of the ponds are full to within a very few inches of the rims.

These rims seem to be encroaching on the ponds in most places, consequently the sides are very abrupt. Sphagnum seems to make up the actual edge that grows out over the water. Islands are abundant in the larger ponds, many of them floating. The floating ones will easily support a man. They protrude 10-15 cm above the water, while the part below may be 1 m. thick. Plants of many sorts grow on them, but no trees or shrubs seen.

The origin and status of these ponds ~~is~~ are very obscure. Possibly they are the last traces of the original lake, being filled in by Sphagnum growth. But their common situation on tops of knolls

1953 Japan

suggests that they may well be of recent origin and connected with the raised bog nature of the knolls. Some shallow puddles and wet shallow depressions with less vegetation than the surrounding ground may be seen. This suggest that ponds may be actually forming. If in a depression growth were slower because of water-logging or being covered by water, a pond would form with the formation of a knoll by upward growth of Sphagnum. Possibly, also, because of differential composition of vegetation the humus in some spots may decompose faster than in others, forming puddles, then ponds. Many processes may well be at work. It is conceivable that a pond may be originating and disappearing at the same time, its existence depending on the greater relative speed of formation than of disappearance. Also complex dynamic equi-

libria may ~~be~~ exist.
It would be interesting to compare the outlines of these ponds on aerial photos taken some years apart.
Rainfall data ~~is~~ much to be desired. The very existence of raised bogs, and especially of ponds on top of them, and of adjacent ponds with different levels would seem to depend on a very abundant and well distributed rainfall.

Many peat cores should be taken and studied. One exists, according to Hara, 6 m. long. Takeda says peat 9 m. deep has been found by boring near the lower end.

In the ponds are both Nuphar and Nymphaea, as well as a very large-leafed Potamogeton.
In a few pools on bog surface and in dry stream course, a slime and film of iron bacteria.

1953 Japan

The Tokyo Electric Co. is planning to flood this area by building a dam below it. The stream that would be dammed is really a small one, at this season no more than ~~5~~ 5 or 6 m. across and ~~2~~ 1-2 m deep. not a very promising source of power. Even though a large amount of water were impounded, no more than the normal flow per year could be used. It scarcely seems that this amount of power would justify the loss, aesthetically and scientifically, that the project would entail. One of the finest forests remaining in Japan, as well as the southernmost station for many boreal plants, the home of many rare animals, as well as this fascinating and as yet little understood bog would be lost.

Animals seen were trout in the streams, ~~salaga~~ newts in the ponds, snipe, plover(?), ~~2~~ jays, etc. Other birds were heard. Fox droppings and tracks were common. Bits of fur remaining where a fox had caught a rabbit were seen. Traps, possibly for foxes had been set by ~~many~~ someone along the trails.

The Japanese scientists, stimulated by the threat of destruction to this area, have inaugurated an extensive scientific study of the area. Papers are beginning to appear.

The area is a part of Nikko National Park.

1953 Japan

Oct. 31 - Ozega-hara moor
extensive boggy plain

3	49	51	Phragmites communis abundant locally near streams, forming low baires.
2		52	Ilex common growing in open peat bog.
3		53	Kalmia polifolia common in open peat bog
4		54	Vaccinium abundant locally in wet sphagnum in peat bog
2		55	Dryopteris in band of woods along stream in bog
2		56	Pachysandra in band of woods along stream in bog.
3		57	Botrychium multifidum common in bands of woods along streams in bog
4		58	Sasa forming ground layer in woods along streams in bog (also occasional patches in open bog, general in woods surrounding bog)
3		59	Lycopodium obscurum common in open bog
3		60	Lycopodium abundant in wetter parts of bog

1400 m. (map)

erect, 1.5 - 2 m tall, forming
rhizomes subterranean.

shrub upto 0.5 m. tall,
fruit black.

erect, leaves white beneath.

prostrate, leaves purple
bronze above, whitish beneath,
fruit spherical, juicy, red,
acid.
fronds prostrate at this
time.

rhizome creeping,
stems ascending.

deep rooted; frond dark green.

rhizomes underground,
prostrate, extensive; culms
erect, the fruiting ones
completely bare of leaf blades.

erect

~~stol~~ stems prostrate,
rooting, sending up fertile stems.

1953 Japan

Nov. 1 – Canyon of Kawakami-gawa, above Ozega-hara

34941		Lycopodium serratum local, forming dense patches in mixed woods	1500 m. erect.

Nov. 1 – slopes of Shibutsu-zan, above Ozega-hara. in low coniferous and mixed scrub.

3	62	Ilex minor component of mixed scrub	1700 m. shrub 1.5 m. tall, fruits scarlet, leaves evergreen.
2	63	Alnus minor component of mixed scrub	– shrub 2 m. tall.
2	64	Quercus dominant in deciduous scrub, component of mixed scrub.	shrub 2 m. tall, leaves dry (fallen from most plants.)
2	65	minor component of mixed scrub	– erect shrub 1.5' m. tall, leaves dried or already shed.
2	66	Hamamelis? important component of mixed scrub	– shrub 2 m. tall.
2	67	Tsuga important component of coniferous and mixed scrub	shrub 2 m. tall, spreading.
2	68	Thuja co-dominant of coniferous scrub	shrub 2 m. tall, sterile.
3	69	Pinus co-dominant of coniferous scrub	shrub 1.5' m. tall, sterile.

Gunma-ken, Tone-gun, Katashina-mura

1953 Japan

Nov. 1 - slope of Shibutsu-yama above Ozega-hara.

On the N.E. slope a mixed ~~forest~~ coniferous forest of Pinus, Tsuga and Thuja extends from the level of the bog at just above 1400 m. up the steep lower slopes of the volcano to perhaps 1650 m. where it thins out, then gives way abruptly to scrub. The forest is of uneven density, with open patches of deciduous scrub, mainly of a dwarf Quercus of the Q. prinoides type. High up there are patches of bog and ~~of~~ open patches of kasa. Kasa also forms a more or less continuous ground layer about 1 m. high in the forest. There are also some ferns and Cornus canadensis where the kasa is absent. The "mor" layer is thick but the soil beneath it is dark gray-brown rather than ashy gray as would be expected. The soil is derived from andesitic tuffs and lavas.

The scrub area is separated by a steep slope from the bog.

above the tall forest is a ~~scrub~~ scrub similar in arrangement and composition to the forest. The slope here is somewhat less steep, on the average.

The scrub is mainly coniferous, with apparently the same species of Tsuga, Thuja and Pinus, but the transition between forest and scrub is abrupt, the forest thinning upward and the deciduous scrub filling in, but above the last trees the coniferous shrubs stand abruptly. The height of this is 1-3 m. while the forest is 10-20 m.

The patches of deciduous scrub and mixed scrub up here have some additional shrub species - Alnus, Hamamelis, & etc. The Ilex is in both forest and scrub.

This scrub seems to go up to near the top of the volcano, but to be patchy upward, dominating most of the slopes except the uppermost. Between the patches are bog and kasa patches.

1953 Japan Philiphines

Nov. 1 - Canyon of Karashina-gawa
Beech-maple forest, dominantly beech.
The sasa layer here seems to be absent, ~~gen~~ usually, from slopes steeper than about 65°; principally replaced by sparse ferns. This may be due to instability, slides, etc. This is not obvious on casual inspection.

Nov. 10 - Fukuoka, Kyushu
Kyushu University campus

34970 Digitaria
3 weed along path
culms spreading to ascending, racemes purplish black.

Nov. 21 - information from several Filipinos on the Philippine fish ponds -
The ponds are in cleared mangrove swamps at the mouths of fresh water streams. The fish is the "bangus" or milk fish, (Chanos chanos).
Fry are caught in the sea and placed in these brackish-water ponds, where they live on algae. Diatoms, Spirogyra and Chaetomorpha are put in the ponds. The fish can grow to 2 ft. long in the sea, but in the ponds are eaten at one foot.

1953 Philippine Is.

Nov. 15 - Lake Taal,
on ledges of tuff cliffs
just above level of Lampalor Lake,
the inner crater lake, a
saline-acidic lake

3 4971 Fimbristylis
4

caespitose, culms
ascending.

Nov. 15 - just north of
Mt. Makeling

2 72 Aeschynomene
abundant along roadside

flower dull salmon,
darker in center of
standard.

1 73 ~~Calopogonium~~
common along road

twining in herbs;
flowers blue.

Nov. 14 - Road from Clark Field
to Manila
Mainly rice fields, but
some sugar cane. On
non-flooded waste ground,
along roadsides and around
edges of plantations Saccharum
spontaneum is abundant.

Artocarpus altilis
(queen form with
ruffled entire leaves)
bamboo.

Nov. 15 - Region of Lake Taal -
principal cultivated plants:
Mangifera indica
Cocos nucifera
Carica papaya
Musa sapientum
Spondias sp.
Santalum indicum

Lake Taal is a large
fresh water lake in an old
caldera. Shells abundant
on beach - sample - ind.
both gastropods and bivalves.
On beach or inland
in lake Ipomoea pes-caprae
was seen. On the bottom
in 1 m. of water was
a luxuriant growth of
submerged rooted aquatics.

(over)

1953 Philippine Is

There are several islands in the lake, including one of some size. This is rough and has several volcanic cones. There is a rather narrow low coastal strip, then a rapid rise, then a broad flattish area, the general top. On this is a large cone, inside which is a smaller caldera. In this is Lake Hampalot, a lake of saline-acid tasting water in which are only some green & blue-green algae. Inside this lake is a small island with very steep sides which appears to be a lava plug. The general material of the volcano appears to be a tuff-breccia. At one end of the lake is an area several hundreds of yards long where, since April of the year, there has been strong fumarolic activity. There is boiling mud, hot water issuing forth, and steam coming out under strong pressure. The hot tuff walls, and the hot earth is covered

Down on the outer slopes (try this) open grassland, fallow clearings, above 2000 ft. are still as marshy patches, as well as in the valleys, etc. ↖ typical swamp forest.

by a blue-green algal felt or mat in some abundance. The walls where this is growing are, in places, too hot to be comfortable to the touch.

On ledges just above the lake are a few tufts of Fimbristylis cymosa (s. ld.). Above the fumarolic area a large patch of brush - Leucaena, acacia, etc. has been killed by the steam.

The interior of the caldera has been much eroded since the 1911 explosive eruption, when the island was covered by ash from the crater. As far away as the boat landing the ash deposit was 3 ft. thick. The freshly eroded areas are sparsely covered, principally by a species of Dalea. Imperata takes over rather soon and forms the background on the entire caldera, its outer slopes, the flat, and, to a slight extent, down the upper part of the outer island slope. This is strongly but locally invaded by Saccharum spontaneum, acacia farnesiana, Leucaena, Ficus, Desmodium pulchellum, etc.

Nov. 21 - Ambuclao dam site, Agno River, Thicket on bottom of steep slope, much disturbed. 650-675 m.

34974 Desmodium
4 edges of thicket
stems procumbent, flowers small, yellow, pods twisted.

3 75 Oplismenus compositus (L.) Beauv.
edges of thicket
culms prostrate to ascending

1 76 Selaginella
common on wet rocks
prostrate, adhering to rocks.

1 77 Tetrastigma
local in edges of thicket
climbing, fruits red, globose.

3 78 Rottboellia
around edges of thicket
erect, branching, 2.5 m. tall, sheaths with irritating hairs.

3 79 Afpoc
thicket
vine-like shrub. flowers cream-white, somewhat fragrant.

1 80 Pteris quadriaurita
in deep rocky ravine

3 81 Asplenium Laserpitiifolium
in deep rocky ravine, common

1 82 Asplenium
in deep rocky ravine

2 83 Acanth
on rock walls in ravine
flowers magenta-pink, corolla caducous.

3 84 Paederia foetida
climbing in thicket
extensive woody vine, odor very unpleasant when broken.

3 85 ~~Tercia~~ Gynura
edges of thicket
herb 1 m. tall, branched, flowers rusty reddish.

2 86 Ficus
in thicket
shrubby tree, 5 m. tall; fruits soft, purple when dead ripe.

1953 Philippine Is.

Luzon

~~88~~ same - foot of open slope.

3 ~~88~~ 89 common in grassy part, along cow paths

1 89 Cyperus
bare eroded ground.

3 89 Daleq
bare eroded ground

3 90 Eragrostis
bare eroded ground

1 91 Cyperus
bare eroded ground, rare

1 92 Fimbristylis autumnalis
bare eroded ground, rare

1 93 Digitaria
bare eroded ground.

3 94 Mitracarpum hirtum
very common on bare eroded ground

~~suffra~~

suffrutescent herb.

erect, stiff, much-branched herb, flowers blue. culms procumbent

erect, flowers white.

Nov. 21 - Agno River drainage system above Ambuklao Dam. - from air. Slopes steep, generally covered by pine savanna. Some evidence of burning; streams running clear now; land slide scars frequent. Grass thin, soil showing through in many places, especially on high slopes on south side of river toward head. Closed vegetation only in ravines and on a few steep n.e. slopes. Ridges scabby and eroded. Rice culture all the way up the valley of main river and larger tributaries above dam site.

Nov. 21 Ambuklao Dam - information from foresters - Dam site is 635 m. alt. Dam will be 131 m. high, will back water up for ~~10~~ 13 km. 6-10 km. linear distance), reservoir capacity 316 million cu. m. 1500 kw. power capacity. Drainage area under 690 sq. km. not over 5000 people in area of which 1200-1500 will be forced out. (ctd. p. 69)

Nov. 22 - Trinidad, near Baguio
hill of soil derived from
volcanic breccia, with
scattered pines on grassy
slopes.

~~3 4995~~
~~3 4996~~

3 4995 Dipteris conjugata
3 occasional in protected
spots

3 96 Blechnum vulcanicum
occasional in grazed area

3 97
common in both grazed
and ungrazed areas.

1 98 Ischaemum
common in grazed area

1 99 Lycopodium cernuum L.
rare in protected spots

35000 Emilia sibipinnatifida Mers.
4 very common in grazed area,
less so in deeper grass.

1 01 Osbeckia
occasional in grazed and
ungrazed areas.

colonies with interlocking
rhizomes, leaves glaucous
beneath.

shrub 1-1.5 m. tall,
flowers lavender purple,
herbage very aromatic

flowers pale lavender
to pinkish lavender.

The Trinidad basin is an
old lake bed, very flat,
surrounded by hills, and
intensively cultivated in
vegetable patches, and
thickly populated.

At the lower end the ~~so~~
stream flows out through a
narrow cut or gorge.

Beside this gorge is a
hill, apparently composed
of a volcanic breccia or
tuff, covered by grass
and scattered pines.

One part of this hill
is excessively grazed.
The ground is covered by a
dense sod of axonopus

compressus, with scattered shrubs of (34997), patches of gleichenia, etc. Emilia bipinnatifida is common in the sod. Some seedling pines.

This is separated from the other part of the hill by a 2 m. ~~vertical~~ vertical escarpment, the top part of which is an earth wall. This is cattle-proof and the vegetation on the other side is a rich grassland of Themeda, Ischaemum, Lophostrum, Pteridium, a little Blechnum, and some but not much 34997. Scattered ~~This~~ Pine seedlings are scattered freely in this area, more so than in the grazed part. The grass ~~On the steep slope~~ here is perhaps 4-5 dm. tall, is considered to be the natural ground cover in the pine savanna. It is also regarded as more nutritive forage than I. imperata.

On the steep slope the composition is about the same, with a certain amount of I. imperata added. Here the students of the agricultural school have

recently planted pine seedlings. These were planted in spots about 3 dm. a more diam. that were cleared of grass and made level. All ~~seedlings~~ planted were dead, while nearby the ones which occur naturally in the grassland are very healthy, protected by the grass till they are several dm. tall and able to survive the exposure.

Acc. Mr. Lajor, of the Bur. Forestry, grass, even Imperata, is valuable as a nurse crop for pines. He says this land has been burned over frequently both the grazed and ungrazed parts. Also that the burning favors the Imperata in competition with the other grasses, and that it gradually assumes dominance. This has not happened here except in a few spots low on the slope.

1953 Philippine Is.

Luzon

Nov. 22 – Barrio Irisan, Baguio
Burned over slope of lateritic soil, open, grassy

3	5002	Ischaemum common	caespitose, culms ascending
2	03	Rubus fraxinifolia occasional in pine plantation	erect shrub with definite main stem, leaves dark green, glossy, firm; fruit orange red, poor flavor, not very juicy.

04

Nov. 22 – Prospect Point, Baguio
road cuts in deeply weathered rock.

1	04	Panicum	
3	05	Ischaemum in rock crevices	diffusely branched, weak culms.
1	06	Ischaemum	
3	07	andropogon common in grassy places and on rocky banks.	caespitose, often much taller, stems then weaker.
1	08	Miscanthus common on banks and talus	large clumps.
3	09	common	caespitose
3	10	Themeda ~~cryptandra~~ abundant, dominant in grassy places.	caespitose, culms ascending, spikelets pendent.
1	11	Christisonia subtilis on steep landslip	leafless, said to be parasitic on grasses; flower white with maroon lobes.

Nov. 22 – Baguio
Weedy wet ravine

1	12	Phragmites karka	erect, canes to 5 m. tall.

1953 Philippines

Nov. 22 - Prospect Point, Baguio.

Here is a forest in a military reservation that is said to be uncut. It is on top and on steep slopes of a rocky hill. The pine cover is perhaps 50-75% except on the steepest rockiest slopes, which have large bare spots. Under these pines is dense grass, apparently largely Themeda and Ischaemum. On steep areas of slides Miscanthus is common. The pines are perhaps 4-6 dm. in maximum diameter, 20-30 m. tall. Eupatorium adenophorum invading disturbed places. In recent openings pine seedlings are coming in abundantly.

In ravine of river some small broad-leafed trees, e.g. Saurauja sp. form thickets.

Nov. 21 - Ambuklao (Cpd.)

Soil holds a great deal of water, tends to slump. Intended to reforest with pine.

Total rainfall said to be 60-72" (other reports up to 170") much of it during severe storms in rainy season.

Formerly the area was grazed heavily, but cattle mostly killed during war. Feed lack because of firearms left after war.

Dry season 5 months, Dec. through April. Burning said to go on from late Nov. for 3 months (but probably really for 5 months). Burning is chiefly by Igorots, who live in tiny villages in hills. Have small rice terraces - burn for pleasure, through carelessness, or to get young grass for cattle.

Repeated burning is causing ~~cause~~ gradual recession and impoverishment of forest, also impoverishment of grassy vegetation between trees. Pattern of bare south slopes and wooded north

slopes has resulted from greater susceptibility of east or south slopes due to greater drainage and dryness.

Taller grasses dominant in grassland on slopes are Themeda triandra and Themeda gigantea. These slopes are about 45°. In addition to Themeda are a large Panicum, Chrysopogon, various legumes and ~~as~~ weeds, incl. Eupatorium adenophorum.

At dam site the riparian vegetation is of ~~Homalia~~ Homonoia riparia, Casuarina equisetifolia and Vitex negundo.

Weeds around the actual site are: Triumfetta semitriloba? Tithonia diversifolia, Ageratum conyzoides, Crotalaria mucronata, Mitracarpum hirtum, Amaranthus spinosus, Eleusine indica, Sida acuta, Canthaospermum scaraberides, Dactyloctenium aegyptium, Cassia sp., Psidium guajava, Teucrium sp., Amaranthus sp., Hyptis suaveolens, Dalea, etc. (Mitracarpum is the most abundant pioneer on bare ground - fine rubble.)

Chrysopogon aciculatus
Elephantopus mollis
Urena lobata
Trichlaena reptans (appeared in P.I. since war)

Imperata exaltata is said to be used for ropes, thatch, etc. Phragmites karka is used for walls, fences, thatch, etc. Miscanthus also used for thatch.

Nov. 22 - Baris Irisan, Baguio

Pine plantation, dating from 1939, burned over by ground fire 2 years ago. Ground cover now dominated by 2 sps. of Ischaemum, with much Eupatorium adenophorum, some Rottboellia, some Pteridium, and scattered Rubus fraxinifolius.

Open ground on gentle slope, burned 2 years ago, covered by Imperata, Themeda, Rottboellia, Miscanthus, Scleria, Psedium, Andropogon, with little Eupatorium.

Part of plantation planted in 1941, repeatedly burned, a few trees left, quite stunted, replanted in 1951, these trees very small and yellow. Soil a deep orange-red laterite.

1953 Philippine Is.

Luzon

Nov. 26 - Los Baños, Laguna Prov.
sunny roadside bank,
in grassy vegetation.

3	5013	Torenia	prostrate, flowers violet, lobes ligulate.
1	14	Cochorus	depressed herb; flowers yellow.
4	15	Hedyotis corymbosa	procumbent, flowers white corolla tube not exceeding calyx.
4	16	Hedyotis biflora	procumbent, flowers white.

same - around dwelling

4	17	Mussaenda philippica (= pondoza ?)	small tree 4 m. tall, enlarged calyx lobe white

edge of woods.

4	18	Mussaenda philippica var. aurora sulit	shrub 1½ m. tall, enlarged calyx lobes white, corollas bright yellow. Plant propagated from a spot found in woods on Mt. Mabiling, now common generally in cultivation.

cultivated

Nov. 24 - Base of Mt. Makiling above Los Baños, Laguna Prov.

2½ decadent primary or tall secondary forest on gentle slopes.

3 50 19 Calliandra
4 occasional in roadside thicket.

1 20 Jacobinia coccinea
occasional along road, said to have been originally planted by H. M. Curran.

3 21 Cyathula prostrata
roadside in forest

2 22 Lygodium
climbing in bushes along road in woods

3 23 Wikstroemia ovata
rare along road in woods

3 24 Lindsaya
on moist vertical rock cut along road.

3 25 Ageratum houstonianum
common along road in woods

2 26 Centrosema
common climing over roadside bushes in woods.

6 27 Pohlia
common in ground layer in wet forest.

shrub 2.5 m. tall, flowers lavender, fruit purple.

shrub 2 m. tall, flowers scarlet.

depressed.
spreading, much-branched herb, flowers whitish.

twiner, sterile.

shrub 0.8 m. tall, bark very tough; fruit scarlet.

erect, to 0.8 m. tall, heads whitish with blue-violet styles, plant very strongly aromatic.

twiner, flowers light purple.

erect, flowers white. fruits globose, bluish.

35028 Begonia
1 rare on ground in wet forest
3 29 Mycetia
rare in shrub layer
in wet forest.
5 30 Nephrolepis
abundant on steeb
banks and road cuts
2 31 Donax cannaeformis
common in wet forest
5 32 Pipturus plilippinensis
~~small tree 4 m.~~
edge of forest along road

4 33 Elephantopus mollis
common along roadside
1 34 Triumfetta
common along roadside

Nov. 26 - Los Baños, Laguna Prov.
in hot ground around hot spring
3 35 Fimbristylis miliacea (L.) Vahl
3 36 Fimbristylis spathacea Roth

Nov. 28 - Quezon City, near Manila
3 37 Saccharum ~~officinarum~~
dominant plant on
very thin soil on volcanic tuff, rock

leaves purplish,
flowers pinkish white.
shrub 1 m. tall, fruits
soft, white, globose.

rhizomes prostrate,
fronds pendent,
pinnae firm.
erect, ~~1~~ ½ - 2 m. tall,
fruit orange

-5 m. tall.
beneath,
white;
aden
achene
tem
irritating;
flowers

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Fimbristylis

Locality Los Baños, Laguna Prov.

Occurrence In hot ground around hot spring.

Date Nov. 26, 1953 Alt. ( )
Coll. F. R. Fosberg No. 35036

Remarks caespitose

Pacific Vegetation Project

large clump in full flower, culms 3 m. tall.

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Fimbristylis

Locality Los Banos, Laguna Prov.

Occurrence In hot ground around hot spring.

Date Nov. 26, 1953 Alt. ( )
Coll. F. R. Fosberg No. 35036

Remarks caespitose

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Pteridium aquilinum

Locality Km. 18 on Baguio-Bontoc Rd., 12 km. from La Trinidad, Bo. of Tabio, Atok Distr., Benguet Prov.

Occurrence Common in grass on steep grassy slope in young pine planting

Date Nov. 30, 1953 Alt. 1700 m. (map)
Coll. F. R. Fosberg No. 35058

Remarks rhizome buried, fronds rather stiff, often much larger.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Pteridium aquilinum

Locality Km. 18 on Baguio-Bontoc Rd., 12 km. from La Trinidad, Bo. of Tabio, Atok Distr., Benguet Prov.

Occurrence Common in grass on steep grassy slope in young pine planting

Date Nov. 30, 1953 Alt. 1700 m. (map)
Coll. F. R. Fosberg No. 35058

Remarks rhizome buried, fronds rather stiff, often much larger.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Sporobolus elongatus

Locality Km. 18 on Baguio-Bontoc Rd., 12 km. from La Trinidad, Bo. of Tabio, Atok Distr., Benguet Prov.

Occurrence common, on steep grassy slope in young pine planting

Date Nov. 30, 1953 Alt. 1700 m. (map)
Coll. F. R. Fosberg No. 35059

Remarks caespitose

Pacific Vegetation Project

3

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Rubus chrysophyllus

Locality Km. 18 on Baguio-Bontoc Rd., 12 km. from La Trinidad, Bo. of Tabio, Atok Distr., Benguet Prov.

Occurrence rare, local in grass on steep grassy slope in young pine planting

Date Nov. 30, 1953 Alt. 1700 m. (map)
Coll. F. R. Fosberg No. 35060

Remarks

Pacific Vegetation Project

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Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Vaccinium

Locality Km. 18 on Baguio-Bontoc Rd., 12 km. from La Trinidad, Bo. of Tabio, Atok Distr., Benguet Prov.

Occurrence on vertical bank of road cut

Date Nov. 30, 1953 Alt. 1700 m. (map)

Coll. F. R. Fosberg No. 35062

Remarks depressed shrub; berries black; flowers white

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Vaccinium

Locality Km. 18 on Baguio-Bontoc Rd., 12 km. from La Trinidad, Bo. of Tabio, Atok Distr., Benguet Prov.

Occurrence on vertical bank of road cut

Date Nov. 30, 1953 Alt. 1700 m. (map)

Coll. F. R. Fosberg No. 35062

Remarks depressed shrub; berries black; flowers white.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Gaultheria

Locality Km. 18 on Baguio-Bontoc Rd., 12 km. from La Trinidad, Bo. of Tabio, Atok Distr., Benguet Prov.

Occurrence common on vertical cuts that have become somewhat re-vegetated.

Date Nov. 30, 1953 Alt. 1700 m. (map)

Coll. F. R. Fosberg No. 35063

Remarks weak pendent shrub; fruit black.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Rhododendron

Locality Km. 18 on Baguio-Bontoc Rd., 12 km. from La Trinidad, Bo. of Tabio, Atok Distr., Benguet Prov.

Occurrence on steep bank of road cut

Date Nov. 30, 1953 Alt. 1700 m. (map)

Coll. F. R. Fosberg No. 35064

Remarks shrub; flowers scarlet

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Rosa

Locality Km. 34 of Baguio-Bontoc Rd., 6 km. east of Atok Distr., La Trinidad, Benguet Prov.

Occurrence occasional on steep bank above road, fairly well vegetated

Date Nov. 30, 1953 Alt 2200 m. (map)

Coll. F. R. Fosberg No. 35081

Remarks tangled shrub

Pacific Vegetation Project

35028 Begonia
1 rare on ground in wet forest
3 29 Mycetia
rare in shrub layer
in wet forest.
5 30 Nephrolepis
abundant on steep
banks and road cuts
2 31 Donax cannaeformis
common in wet forest
5 32 Pipturus philippinensis
~~small tree 4 m.~~
edge of forest along road

4 33 Elephantopus mollis
common along roadside

1 34 Triumfetta
common along roadside

Nov. 26 - Los Baños, Laguna Prov.
in hot ground around
hot spring
3 35 Fimbristylis miliacea (L.) Vahl
3 36 Fimbristylis spathacea Roth

Nov. 28 - Quezon City, near Manila
3 37 Saccharum ~~officinarum~~
dominant plant on
very thin soil on volcanic tuff, rock

leaves purplish,
flowers pinkish white.
shrub 1 m. tall, fruits
soft, white, globose.

rhizomes prostrate.
fronds pendent,
pinnae firm.
erect, ufs 1½ - 2 m. tall,
fruit orange
small tree 4-5 m. tall,
leaves white beneath,
styles long, white;
fruiting receptacles
white, fleshy, ~~fr~~ achenes
in small pits.
erect, hairs on stem
stiff, slightly irritating;
flowers white.
herb 2 m. tall; flowers
yellow.

caespitose
caespitose

large clump in full
flower, culms 3 m. tall.

1953 Philippine Is.
Manila Plain,

Nov. 29 - Drained rice paddies

Weeds observed:

Malachra
Alysicarpus vaginalis
Taenia sp.
Commelina diffusa
Anerlema sp.
Sida acuta
Urena lobata
Cyanotis
Urena lobata
Cassia timnensis
Eclipta alba

Nov. 29 - Gorge of Kennon River, km. 234 on Kennon road

steep rock walls of road cut.

35038 Emilia sonchifolia (L.) DC.
1 rock crevices, rare
~~39 Pityrogramma calomelo~~
1 39 Pityrogramma calomelanos
rock crevices
4 40 Blechnum
common in rock crevices
1 41 Cheilanthes
rare in rock crevices
1 42 Kalanchoe integra
common in rock crevices

Vernonia cinerea
Fuirena linifolia
Scirpus laevigata ?
Rottboellia sp.
Fimbristylis sp.
Fuirena
Ipomoea nil
Euphorbia hirta

Eupatorium adenophorum is occasional here. Pine savanna may be seen from here on the hills above.

head narrowly cylindric, flowers purple, little exceeding involucre. (other plants much larger)

pond curling when dry, white beneath.
leaves fleshy; flowers bright yellow.

1953 Philippine Is.

Nov. 29 - Gorge of Kennon River. km. 219 on Kennon Road

vertical cliff (road cut) of conglomerate, seeps of water occasional.

35043 Selaginella
" common in seeps
7 44 uncommon

1 45 Adiantum
occasional in wet places and seeps.
1 46 Selaginella
occasional in damp places
3 47 Adiantum cuneatum
common on wet rocks
1 48 Utricularia
common on wet rocks
1 49
3 50 Cenchrus brownii
common along
2 51 Acalypha
rare on cliff
3 52 Coleus
common on damp rocks.

sterile stems prostrate, fertile ascending. Forming a tangle of ~~woody~~ woody vine, pendent leaves somewhat glaucous beneath; flowers yellow-green with dark brown disk.

stems not prostrate.

(possibly more than one species) flowers with yellow eye, white band, pink limb. climbing in bushes, flowers greenish.

shrub 1.5 m. tall

leaves purplish; flowers deep violet-blue.

1953 Philippine Zn.

35053 Lindenbergia
occasional in crevices

2 54 Impatiens platypetala
common on wet rocks

3 55 Conzera diffusa
common on moist rocks

Nov. 29 - Agno River

Broad flats of sand apparently recently deposited by the river, are largely covered by an uneven stand of small clumps of Saccharum ~~officinarum~~ spontaneum. (same thing seen on similar flats on River).

Nov. 30 - Km. 18 - ~~from~~ Trinidad "King Solomon's Mines"; ~~Baguio~~ Bo. of Tabio, Atok ~~on~~ Baguio-Bontoc Rd. Dist. Benguet Prov.

pine plantation, plants 1.5 m. tall, on steep grassy slope, Imperata dominant.

1 56 Ischaemum
common, forming patches

4 57 Pogonostemon
single bush on ridge at edge of front

erect; flowers yellow

stem fleshy;
flowers magenta-pink
erect; flowers
white.

(Agno - Naguilian river divide).

Slope about 50°, spacing of pines about 2 m.; ground cover of Imperata, with Themeda, Ischaemum, Axonopus compressus, Elephantopus mollis, etc. 1700 m.

procumbent; spikes
maroon.

shrub 1.5 m. tall; flowers
bright purple.

1953 ~~Luzon~~ Philippine Is.

35058		Pteridium aquilinum common in grass	rhizome buried; fronds rather stiff, often much larger.
2			caespitose.
1	59	Sporobolus elongatus common	
3	60	Rubus chrysophyllus rare, local in grass	
		same - on vertical bank of road cut	
2	61	Stenoloma chinensis common in crevices	
2	62	Vaccinium	depressed shrub; berries black; flowers white.
1	63	Gaultheria common on vertical cuts that have become somewhat revegetated.	weak pendent shrub; fruit black.
1	64	Rhododendron on steep banks.	shrub; flowers scarlet

On the west slope, here, there is much thicker undergrowth where a planted pine woods has reached 1 dm. dbh and 8 m. height.

On cut banks are Lycopodium cernuum, Vaccinium, etc. which are not on the grassy slopes.

1953 Philippines

Luzon

15 km. N

Nov. 30 - Km. ~~73~~ 23 from La Trinidad, (on Baguio - Bontoc Rd.) ~~Bo. of Tabio~~, Atok Distr., Benguet Prov. (Agno - Naguilian river divide) Prov.

1750 m.

Steep road cuts in pine savanna

3506	5	Buddleia on talus below road	small slender tree 3-4 m.
2	66	Trema on talus below road	tall; flowers white.
1	67	Emilia roadside	shrub 1 m. tall;
2	68	Dianella javanicum common on steep banks	leaves firm.
1	69	Gaultheria common on steep banks	leaves firm, purple.
1	70	Lycopodium cernuum L. common on steep banks	flowers dull reddish.
2	71	Gleichenia linearis occasional on steep banks	flowers white;
1	72	Lycopodium complanatum L. rare on steep bank	fruit black.
1	73	Lycopodium clavatum L.	weak shrub; flowers

green with red tips;

all plants small.

Trailing, rhizome, superficial, rooting; sterile.

Few pines here, Miscanthus, much invasion by Eupatorium adenophorum. Some relicts of montane forest, especially in ravines, with Saurauja, Helicia, Ficus, etc.

3 sp. Lycopodium on road cuts.

Nov. 30 - Km. 34

Steep slopes, mostly about 60°, mostly grassy a with cultivated patches, some pines, some strips of what appears to be mixed montane forest, some on slope, some in ravines, with Cyathea,

1953 Philippines

Nov. 30 – Km. 34 ~~from~~ ~~Baguio~~ e. of La Trinidad, Benguet on Baguio-Bontoc Rd.

Steep mossy cut banks above road, fairly well vegetated

3507½		Desmodium dasylobum common along roadside
2	75	Hydrocotyle common on wet banks
1	76	Sedum australe rare on bank
1	77	Luvetia rare
~~1~~	~~78~~	~~Euphrasia borneensis~~
1	78	Euphrasia borneensis var. rare on steep bank
1	79	Selaginella common on steep wet banks
2	80	Isachne common on steep wet banks
1	81	Rosa occasional on steep bank
1	82	Hedyotis rare on bare earth bank
2	83	Polypodium common on steep banks
1	84	Conyza occasional on bare earth
1	85	rare ~~on banks~~ in rock crevice
1	86	Epilobium common on earth banks
1	87	Cryptotaenium common

are this → Km. 34 on Baguio-Bontoc Rd., 6 km. e. of Atok Distr., La Trinidad, Benguet Prov. (agno-Naguilian river divide)

2200 m.

large herb; flowers purple.

prostrate.

fleshy; (flowers yellow-green on other plants)

erect; petals greenish, thickly marked with purple; gland green. flowers pink, anthers deep purple.

erect

prostrate.

tangled shrub

erect, bluish green

erect; flowers white.

erect,

1953 Philippines

Kuyan

3 5088 4		Selaginella local on steep bank	prostrate; stems reddish, leaves lustrous.
2	89	Dimeria? occasional	culms spreading
2	90	Ischaemum occasional on bank	erect.
1	91	Spiranthes occasional on steep bank	
2	92	 common on steep bank	culms diffuse.
1	93	Lycopodium rare on steep bank	
1	94	locally common ~~rare on bank~~	prostrate; flowers pale brown to off-white, fruit scarlet, fleshy.
~~1~~			
1	95	Polygonum chinense common along roadside	prostrate; flowers pink, fruit black, fleshy.
1	96	Fimbristylis rare along roadside	Caespitose, culms spreading.

Nov. 30 - Km. 90 ~~from Trinidad~~ along Baguio - Bontoc Road, 30 km. 2200 south of Bontoc, Bontoc Dist.

	?	Mixed montane rain-forest with a few pines.	
1	97	 roadside, rare	prostrate; fruit scarlet.
3	98	Perottetia in forest	tree 6 m. tall; flowers greenish, fruit black subglobose; leaves glossy;
~~2~~	~~99~~	~~Decaspermum~~	
2	99	Decaspermum fruticosum in forest	small tree; petals white, stamens pink.

1953 Philippine Is.

Luzon

Dec. 1 – Polis Pass, Mt. Polis — 2000-2100 m.
17 km. from Bontoc, Bontoc Prov.

Cloud forest

35100 Sambucus javanica — suffrutescent, spreading,
1 in open near edge of forest — 1 m. tall.
along road.

3 01 Emilia prenanthoidea — erect, stiff; leaves
roadside ledges — purplish, especially
and banks, full — beneath, very firm
sun. — margins slightly,
— closely, and irregularly
— revolute; corollas
— from white to pale
— lavender to dull reddish;
— anthers purple.

6 02 Vaccinium — fronds stiff, arching
common on cut banks — downward,

3 03 Nertera — prostrate, forming
common on vertical — mats; leaves definitely
cut bank above road — crispate; fruit scarlet,
— juicy, translucent.

3 04 Pratia — prostrate; pedicels
common on vertical — erect. flowers zygo-
cut bank above road. — morphic, tube yellow,
— lower side of throat and
— lower lip dull carmine,
— upper lip white.

1 05 Lavanja — small tree; flowers
— not yet at anthesis.

3 06

stem appressed against tree, semi-climbing

1957 Philippine Is

35107		Boneilla floor of forest, around bases of trees	Luzon erect, stems succulent, translucent, reddish; flowers pink.
1	08	Hymenophyllum on tree trunks	
3	09	Vittaria on tree trunks	fronds pendent, vein visible by transmitted light.
(6)	10	Hedyotis in understory	slender small tree, 3-4 m. tall; fruit immature.
	11	~~Polypt~~	
4	11	Polypodium on tree trunks	
3	12	Lycopodium on tree trunks	pendent
1	13	Geniostoma common in understory	slender shrub or small tree, very rarely fruiting.
4	14	Lindsaya on tree trunks	
2	15	Melastoma in understory	shrub 2 m. tall.
2	16	Gesne common climbing on tree-trunks	climber; flowers red.
2	17	Dendrochilum on tree trunks	caespitose; flowers dull yellow, odorless.
1	18	Dendrochilum on tree trunks	flowers white, with some fragrance.
1	19	Asplenium on tree trunks	fronds pendent, rooting at tips.
2	20	Polypodium on tree trunks	
1	21	Dryopteris on tree trunks	

1953 Philippines 2s.

1	35122	fern on tree trunks	
2	123	Hymenophyllum common on tree trunks	
3	124	Polypodium common on tree trunks	
2	125	Trichomanes common low on tree trunks	
4	126	Nertera on forest floor, dead twigs, etc.	Trailing, forming a loose mat. leaves flat, fruit scarlet, glossy, juicy, translucent.
4	127	Medinilla myrtifolia on very steep slope	~~Erect shrub~~; Diffusely branched small shrub; fruits scarlet on scarlet pedicels.
2	128	Dendrochilum on tree trunks	flowers white, odorless.
2	129	Dendrochilum on tree trunks	flowers ~~yellow~~ yellow
3	130	Trichomanes on densely shaded earthy banks	dark green
2	131	Argostemma on floor of forest ~~on~~ around bases of trees.	prostrate succulent stems, ascending at tips.
2	132	Rubus on steep bank above road	prostrate
2	133	Nertera on earthy bank, forming mat, adhering closely to earth	prostrate; leaves crisped; fruit scarlet, juicy, translucent.
1	134	~~f~~ rub. on steep bank	prostrate; flowers white within, purplish without.

1953 Philippines

35 135 2		Elatostema common on bottom of ravine
1	36	Selaginella occasional on wet vertical bank
1	37	Hedyotis roadside bank
2	38	Dennstaedtia common on road cut
1	39	Asplenium on tree trunk
3	40	Asplenium tenerum on tree trunk, common

Going up the road from Bontoc the process of destruction of montane rain forest is quite clear. At the higher altitudes the forest is mostly undisturbed, but lower down strips out into patches of pine and fresh clearings, of more & less similar shape and distribution. Lower down pine forest and clearings alternate, with rice terraces in some places.

Upward the transition from ordinary montane rain forest to cloud forest a mossy forest is ~~not~~ very gradual. The scattered pines which occur on steep ridges drop out upward.

prostrate

shrub 1 m. tall.

fronds stiffish, bending downward.

Extra labels not proofread

PLANT
Em
Loca
Occ
Date Dec. 3, 1953 Alt.
Coll. F. R. Fosberg No. 35191
Remarks flowers pale pink

Pacific Vegetation Project

Freycinetia and several Gesneriaceae are woody vines. Orchids and ferns of numerous kinds cover the trees in a substratum of moss. Rhododendron sp. is an epiphyte.

Extra labels
not proofread

Aol.

1500 m.

alt.

4

PLANTS OF THE PHILIPPINE ISLANDS
LUZON
Emilia pinnatifida Merr.

Locality Baguio, Mountain Prov.

Occurrence common on open bank along roadside.

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)
Coll. F. R. Fosberg No. 35191

Remarks flowers pale pink

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
Gaultheria LUZON

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence common in thick secondary scrub, flat ground on broad ridge top near reservoir

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)
Coll. F. R. Fosberg No. 35190

Remarks erect shrub 1.5-2m. tall, flowers green with lobes red externally; wintergreen odor when broken

Pacific Vegetation Project

3

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LUZON
Gaultheria

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence common in thick secondary scrub, flat ground on broad ridge top near reservoir

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)
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Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Glochidion

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence rare in patch of wood on steep slope

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)
Coll. F. R. Fosberg No. 35178

Remarks small tree

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Glochidion

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence rare in patch of wood on steep slope

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)
Coll. F. R. Fosberg No. 35178

Remarks small tree

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Glochidion

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence rare in patch of wood on steep slope

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)
Coll. F. R. Fosberg No. 35178

Remarks small tree

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Pittosporum

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence fairly common in patches of woods on steep slopes

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)
Coll. F. R. Fosberg No. 35179

Remarks small tree with very strong oily odor; fruits smooth, slightly compressed, yellowgreen

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Pittosporum

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence fairly common in patches of woods on steep slopes

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)
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Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Pennisetum alopecuroides

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence common on bare earth and rocky places, flat ground on broad ridge top hear reservoir.

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)

Coll. F. R. Fosberg No. 35180

Remarks caespitose, variable in stature with conditions, spikelets more spreading when alive.

Pacific Vegetation Project

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LUZON

Pennisetum alopecuroides

Locality Mt. Santo Tomas, Mountain Prov.

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Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Juncus

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence occasional in bare wet earth in poorly drained spots in roads, paths, etc.

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)

Coll. F. R. Fosberg No. 35181

Remarks densely coespitose, strictly erect.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Juncus

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence occasional in bare wet earth in poorly drained spots in roads, paths, etc.

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Remarks densely coespitose, strictly erect.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence common in open bare or grassy places, flat ground on broad ridge top hear reservoir

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)

Coll. F. R. Fosberg No. 35182

Remarks erect, white

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence common in open bare or grassy places, flat ground on broad ridge top hear reservoir

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)

Coll. F. R. Fosberg No. 35182

Remarks erect, white

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence common in open bare or grassy places, flat ground on broad ridge top hear reservoir

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)

Coll. F. R. Fosberg No. 35182

Remarks erect, white

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence common in open bare or grassy places, flat ground on broad ridge top near reservoir

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)

Coll. F. R. Fosberg No. 35182

Remarks erect, white

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence rare in edge of low brush flat ground on broad ridge top near reservoir

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)

Coll. F. R. Fosberg No. 35184

Remarks flower white

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence rare in edge of low brush flat ground on broad ridge top near reservoir

Date Dec. 3, 1953 Alt. 1700-1800 m. (map)

Coll. F. R. Fosberg No. 35184

Remarks flower white

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Elaeagnus

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence occasional in secondary scrub, flat ground on broad ridge top near reservoir 1700-1800 m. (map)

Date Dec. 3, 1953 Alt.

Coll. F. R. Fosberg No. 35185

Remarks scrambling shrub, branches elongate.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Elaeagnus

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence occasional in secondary scrub, flat ground on broad ridge top near reservoir 1700-1800 m. (map)

Date Dec. 3, 1953 Alt.

Coll. F. R. Fosberg No. 35185

Remarks scrambling shrub, branches elongate.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Mt. Santo Tomas, Mountain Prov.

Locality

Occurrence abundant in low thick secondary scrub, flat ground on broad ridge top near reservoir 1700-1800 m. (map)

Date Dec. 3, 1953 Alt.

Coll. F. R. Fosberg No. 35188

Remarks main culms arching, smaller ones scrambling and climbing over tall shrubs, forming tangles.

Pacific Vegetation Project

PLANTS OF THE PHILIPPINE ISLANDS
LUZON

Locality Mt. Santo Tomas, Mountain Prov.

Occurrence abundant in low thick secondary scrub, flat ground on broad ridge top near reservoir 1700-1800 m. (map)

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Remarks main culms arching, smaller ones scrambling and climbing over tall shrubs, forming tangles.

Pacific Vegetation Project

1953 Philippine Is.

75 135	Elatostema	
2	common on bottom of ravine	
1 36	Selaginella	
	occasional on wet vertical bank	
1 37	Hedyotis	
	roadside bank	
2 38	Dennstaedtia	
	common on road cut	
1 39	Asplenium	
	on tree trunk	
3 40	Asplenium tenerum	
	on tree trunks, common	

Going up the road from Bontoc the process of destruction of montane rain forest is quite clear. At the higher altitudes the forest is mostly undisturbed, but lower down it is cut into patches of pine and fresh clearings, of more or less similar shape and distribution. Lower down pine forest and clearings alternate, with rice terraces in some places.

Upward the transition from ordinary montane rain forest to cloud forest or mossy forest is very gradual. The scattered pines which occur on steep ridges drop out upward.

prostrate

shrub 1 m. tall.

fronds stiffish, bending downward.

The general stature becomes low, the diameter of trees small – 10-20 m. tall, 1-3 dm. thick. Epiphytes of many sorts become extremely abundant. Weinmannia, Lauraja, Homalanthus, Helicia, Quercus, etc. are important tree components. Shrubs and understory trees are numerous Ericaceae, Melastoma, Medinilla, Hedyotis, Lauraja, Geniostoma, etc. Pteridium and several Gesneriaceae are woody vines. Orchids and ferns of numerous kinds cover the trees in a substratum of moss. Rhododendron sp. is an epiphyte.

1953 Philippines

Luzon

The canopy is essentially complete, of bumpy irregular tree crowns, very mossy. The understory is uneven and not sharply distinct, but is very thick and not easily waltzed through. A few ferns, bebe and creepers are on the ground, but do not form a complete ground cover. The ground is covered fairly completely by a layer of humus, partially decayed logs and branches, etc.

Dec. 2 – Bontoc, Bontoc Dist.

35141 Peperomia pellucida cultivated in garden

used by local people in snake-bite remedies in combination with other plants.

Dec. 2 – Km. 97 ~~from Trinidad~~ (on Baguio-Bontoc Rd.) 25 km. south of Bontoc, Sabangan Distr., Bontoc Prov. 6700' 2000 m

Thick pine woods on steep slope.

35142 gentian ~~Asiatic~~? flowers pale green thickly marked with maroon purple, scrambling ~~shrub~~ herb; flowers white; fruiting calyx black, fleshy

2 steep bank above road

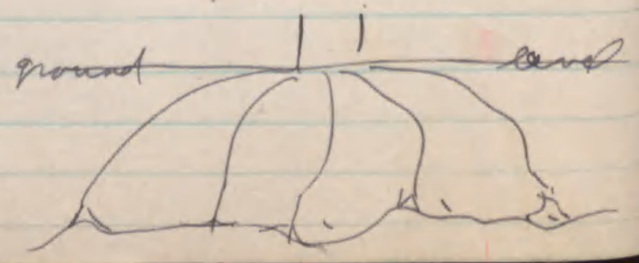
1 43 Polygonum on wet bank

1 44 Torenia on step slope under pines, in thick layer of needles.

6 45 Pinus insularis dominant tree, forming pure stand, fairly tree 4 dm. diam. 25 m. tall.

Thick pine wood on 30°± slope, with a dense ground layer of Eupatorium adenophorum and Micanthus floridulus. Trees 1-2' dbh. 100' tall ±. Ground covered by a layer of needles, 1-2" ~~deep~~, of fine humus, 1-2" of black earth, then yellow earth.

Pine root system



1953 Philippine Is.

Luzon

Dec. 2 - Km. 54, ~~from Trinidad~~ on Baguio - Bontoc Road, 5 km. south of Mt. Osdung, Buguias Distr. La Trinidad, Benguet Prov. small remnant of mixed forest with mainly Quercus, Podocarpus, and Polyosma on steep slope. (Agno - Naguilian river divide) 2400 m.

35146 Hemiphragma heterophyllum roadside — prostrate

1 47 Schefflera in understory — shrub 2-5 m. tall; leaves glossy; fruits maroon; herbage strongly oily-aromatic when broken.

1 48 Podocarpus nerifolius occasional — tree 10 m. tall; leaves dark green when mature, yellow-green when young.

4 49 Polyosma common ~~on slope~~ — tree 8 m. tall; flowers greenish-purple; fruit black when ripe

Dec. 2 - Km 41, ~~from Trinidad~~ on Baguio - Bontoc Road 3 km. south of Mt. Pawoi (Height's Place) Atok Distr., La Trinidad, Benguet Prov. 2000 m. (Agno - Naguilian river divide)

6 50 Gordonia on bare ridge in pine forest country — small tree 6 m. tall; flowers large, white, fragrant.

1953 Philippine Is.

Dec. 3 – Mt. Santo Tomas
Mountain Province

Weedy secondary vegetation with relicts and scattered thickets from original forest steep slopes. 1701 - 1801 m

35151 Gunnera macrophylla
in wet place in road cut
— plant rather succulent, spreading by elongate runners; flowers maroon.

2 52 roadside
— shrub 1.5 m. tall, flowers white.

2 53 Lasianthus javanicus
in Eupatorium patch along road
— suffrutescent herb, 1 m. tall, flowers white, nectar-cups yellow.

3 54 Rhododendron
on cut bank above road
— shrub, 2 m. tall, erect; flowers dull vermillion.

3 55 Nertera
on moist cut banks above road
— prostrate, forming thin mat, flowers yellowish green, fruits scarlet, juicy, translucent.

6 56 Vaccinium
in thicket on steep slope
— shrub 3.5 m. tall, young growth red; buds red. (resembles Thibaudia of Trop. America)

2 57 Gaultheria
on vertical cut bank
— pendent shrub, flowers pale green with red patches on lobes, fruits black, slightly elongate.

2 58 Imperata cylindrica
common on burned slope
— erect culms from buried rhizomes.

59 Dianella javanica
common on steep banks and cuts
— flowers pale blue, fruit black.

1953 Philippine Is.

Luzon

~~3 5 D 3~~ same — dense grass on steep slope with scattered pines

3 5 160 grass
2 occasional — culms ascending & erect

3 61 grass
subdominant — culms ~~ca~~ ascending & erect, caespitose, fire resistant.

2 62 Muhlenbergia
occasional — culms ascending

2 63 Drymaria cordata (L.) Willd.
common around garden site and house — mature pedicels glutinous, ~~calyx~~ easily detached; flowers white.

1 64 Emilia pinnatifida Merr.
rare ~~in~~ in the bare place on steep ridge — flowers white.

1 65 Cayophyll
occasional in paths and bare spots — flowers white.

2 66 grass
local — culms weakly ascending from densely matted rhizomes.

Mt. Santo Tomas - around reservoir and road just below it.
Steep slopes with, here and there, remnants of montane forest - many genera, esp. Quercus Homalanthus, Mallotus, Pittosporum etc. alternating with strips of Pinus, broad landslides and areas, especially on less steep slopes, of brush of Vaccinium — "Chusquea", Miscanthus, Gaultheria, Pteridium etc. The whole is much invaded by Eupatorium adenophorum.

1953 Philippine Is.

same - very steep slopes and road cuts, with patches of original forest

35167 Dianella javanica
common on slight, steep rocky slopes and road cuts.

1 68 Belvisia
rare on bare rock

2 69 Ester
occasional on road cuts and steep slopes under pines

5 70 Pellionia
occasional in secondary scrub on steep slopes and roadsides

~~71~~

5 71 Homalanthus
common in patches of forest on precipice

2 72 Lobelia
rare on road cut on bare crumbly rock

3 73 Pellionia
steep grassy slopes

4 74 Ficus
in patch of forest on steep slope

3 75 Clethra
in patch of forest on steep slope

Luzon.

flowers pale blue; fruit black when mature.

rays white, disk pale yellow.

shrub 1.5 - 2 m. tall, ripe fruit red (fruiting twig from different bush than flowering)

small tree, leaves white beneath; both sexes of flowers on same tree but staminate very scarce.

fruiting stem, leafless, 1.5 m. tall (not certain that leafy plant belongs here)

leaves weals, infl. arching, fruits blue, fleshy.

small tree, branches erect & ascending, fruits immature.

shrub 3 m. tall

3	76	Belvisia epiphytic on tree trunks	
2	77	Carex common in grassy places and on bare spots	caespitose in small tufts, perigynia red, fleshy.
3	78	Gleichenia rare in patch of wood on steep slope	small tree
4	79	Pittosporum fairly common in patches of woods on steep slopes	small tree with very strong oily odor; fruit smooth, slightly compressed, yellow-green.
	~~80~~		
		same - flat ground on broad ridge top near reservoir	
4	80	Peniniselum alopecuroides common in bare earth and rocky places	caespitose, variable in stature with conditions, spikelets more spreading when alive.
6	81	Juncus effusus? occasional in bare wet earth in poorly drained spots in roads, paths, etc.	densely caespitose, strictly erect.
4	82	Amaranthus spinosus? common in open bare & grassy places	erect, white
5	83	Gnaphalium common in bare spots	erect, yellow
2	84		flower white
		rare in edge of low brush	
	85	Elaeagnus occasional in secondary scrub	scrambling shrub, branches elongate.

1953 Philippine 2.

35186
5 Labiat.
roadside

4 87 Gaultheria
common in thick secondary scrub

2 (88 Eurycoma
1. (89 abundant in low thick secondary scrub

90 ~~89~~ Gaultheria
common in thick secondary scrub

Mt. Santo Tomas - Pine covered slopes at about 1700-1800 m.
slope 30°, 35° scattered pines with grassland beneath mainly Ischaemum, some scattered Miscanthus, several other grasses forming a dense ground cover up to 1 m. tall, mostly about 60 cm. young pines occasional. Really too dense for Emilia, Osbeckia

Dec. 3 Baguio,

4 91 Emilia ~~sp~~ pinnatifida Mer.
common on open bank along roadside.

branched at base, flowers pale lavender, fragrant.
erect shrub 1.5-2 m. tall, flowers pale green with ~~pink~~ wintergreen lobes, older main culms arching, smaller ones scrambling and climbing over tall shrubs, forming tangles.
erect shrub 1.5-2 m. tall, flowers green with lobes red externally, wintergreen odor when broken.

etc. which are rare. Where there has obviously been burning ~~Imperata~~ Miscanthus take hold and Miscanthus becomes more abundant. Charred, burned sawed stumps are evidence of at least light burning even in the wooded areas.

Mixed forest, judging by remnants, is more or less uniform from about 1500 to 1900 m. but only scraps are left. Weed flora changes downward but Eupatorium remains dominant.

flowers pale pink

1953 Guam

Dec. 7 - Tamuning

35192 Hedyotis corymbosa?
on coral gravel path

Dec. 7 Mt. Alutom, 1½ mi. W. of Pago River
eroded place in volcanic area - list of species casually observed:
Blechnum vulcanicum
Polygala paniculata
Chrysopogon aciculatus
Stenolema sp.
Wikstroemia elliptica
Melastoma malabathricum
Centella asiatica
Pennisetum
Casuarina equisetifolia
Gleichenia linearis
Myrtella bennigseniana
Fagraea berteriana (steril)
Miscanthus floridulus
Scaevola frutescens
Glochidion marianum
Lycopodium cernuum
Geniostoma
Melochia sp.
Decaspermum fruticosum
Phyllanthus saffordii
Rhynchospora aurea ~~caespitosa~~
Hyptis capitata
Waltheria indica.

15 m.

decumbent to ascending, fls. white.

Dec. 7 - 3.5 km. w. of Tyliq Bay 18 m.

occ. { on top of flat topped erosion remnant of dk. bright red soil, volcanic area. (with sparse grass, some bare ground, some broad leafed herbs and shrubs, patches of Gleichenia, a row of Casuarina trees on edge of remnant, abundant Casuarina seedlings.

List of species observed:
Casuarina equisetifolia
Ageratum conyzoides
Myrtella bennigseniana
Decaspermum fruticosum
Glossogyne tenuifolia
Mitracarpum hirtum
Gleichenia linearis
Melastoma malabathricum
Hyptis capitata
Wikstroemia elliptica
Paspalum orbiculare
Waltheria indica
Chrysopogon aciculatus
Scaevola frutescens
Glochidion marianum
Stachytarpheta indica
Cenchrus echinatus

1952 Guam

~~Cenchrus echinatus~~

3 5 4	193	~~Rynchospora~~ ~~cubrachaenus~~ Scleria punctata ~~Cyperus rotundus~~	cross out alt. change to Scleria punctata
2	94	Heteropogon contortus occasional small patches	small tufts, culms weak, arching
3	95	Fimbristylis annua scattered	tufts.
2	96	Paspalum orbiculare occasional	
3	97	Dimeria chloridiformis common	tufts, gray-green
3	98	Dianella occasional	flowers almost white.
3	99	Phyllanthus saffordii occasional	erect, somewhat sensitive.
4	100	Andropogon fragilis R. Br. common	loose tufts
5	01	Dimeria ornithopoda common on bare spots.	forming loose carpet.

Dec. 1 - 7 km. w. of Ylig Bay

Erosion remnant with flat top, straight sides at top, bright red soil, changing to irregular pink below.

Sparse grassland with some broad-leafed plants and Casuarina seedlings.

1953 Guam

Dec. 9 - Aniguia, just W. of Agaña
Limestone cliffs
Leucaena glauca
community on soil talus
on lower ledges and at base
of cliffs a Brown soil, very
fine, with small to
large fragments mixed with it:

a Leucaena glauca
a Phyllanthus marianus
c Triphasia trifolia
o Callicarpa candicans
o Carica papaya
o Artocarpus altilis
c Tectaria crenata } on vertical
c Dryopteris } limestone.

The Leucaena is completely
dominant, in size ranging
from pencil size to 5 cm. diam.
up to 4-5 m. tall.

On the cliffs above this
is a mixed scrub - not
investigated carefully, but
composition more a less:
Triphasia trifolia
Melanolepis multiglandulosa
Entada phaseoloides
Heterospathe elata
Cananga odorata
Pandanus tectorius
Abrus precatorius

Carica papaya
Ixora triantha
Muntingia calabura
Intsia bijuga
Desmodium umbellatum
Hedyotis foetida
Phyllanthus marianus
Artocarpus ~~com~~ altilis

1953 Guam

Dec. 9 - Com-Marianas quarry, Fonte talus and ledger in limestone quarry — 180 m.

35204 Pennisetum — erect, spikes slightly nodding.
on bare floor of quarry

3 05 Pilea microphylla L. — stems fleshy, ascending.
on talus, common

5 06 Conyza canadensis (L.) Cronq. var. pusilla (Nutt.) Cronq. — erect, flowers white.
~~the~~ common on talus

7 07 Pteris
in rock crevices

in addition were seen:
Ipomoea nil?
Scaevola frutescens
Leucaena glauca
Euphorbia heterophylla
Heliotropium ovalifolium
Phyllanthus marianum

Dec. 9 - Harmon Field quarry — 60 m.
on bare limestone debris

1 02 Cynodon dactylon — prostrate (not the
bare lime sand — parviglumis form of Okin.)
large diffuse clumps,
culms 2 m. tall.

4 03 Saccharum officinarum
on pile of pulverized, slightly indurated lime-sand.

in addition:
Pilea microphylla
Heliotropium ovalifolium
Stachytarpheta indica
Pennisetum
Euphorbia heterophylla
Conyza canadensis

Dactyloctenium aegyptium
Elusine indica
Pteris tripartita
Dentella repens
Solanum nigrum
Carica papaya

1953 Guam

Dec. 10 - Com. Marianas Fuel storage area, El Patio Road entrance

Flat topped erosion remnant of deep red soil.

35+08		Sclieria	culms arching
3		under Casuarina trees on	
3	09	Maytenus	shrub 1.5 m. tall, fruit
		rare on	immature.
1	10	Hedyotis megalantha Mers.	
		rare on eroded red clay around	
3	11	Glochidion	shrub 1.5 m. tall, leaves
		occasional on	somewhat glaucous beneath
2	12	Geniostoma micranthum var. micranthum	shrub 1 m. tall; leaves
		occasional on	glossy; flowers white.
3	13	Melochia	shrub 1.5 m. tall; flowers
		rare on	bright deep pink.
3	14	Timonius	shrub 1 m. tall; flowers
		occasional on	dull whitish.
3	15	Timonius	shrub 1.5 m. tall; ripe
		occasional on	fruit shiny, black.

Flat surface, in place very poorly drained, grassy, principally Dimeria and gleichenia being invaded by Casuarina and shrubs. ~~Species~~ Species seen:

a Casuarina equisetifolia
a Gleichenia linearis
c a Myrtella bennigsenana
a Dimeria chloridiformis
l a Miscanthus floridulus

100 m.

l o Hyptis capitata
a c Melastoma malabathricum
c Dodonaea viscosa
c Wikstroemia elliptica
c Chrysopogon aciculatus
c Scaevola frutescens
l a Elephantopus mollis
l c Triphasia trifolia
l c Pennisetum
o Leucaena glauca
o Dianella

1953 Guam

- o Hedyotis
- o Scleria
- o Waltheria indica
- lo Timonius
- r Melochia
- r Bleekeria mariannensis
- r Cassytha filiformis
- r Alyxia torresiana
- r Geniostoma
- r Decaspermum fruticosum
- r ~~Maytenus~~ ~~Pycnarrhena~~
- r Pteris

Dec. 11 - above Tenjo Vista

eroded knob of mush weathered pyroclastic breccia, some residual soil in place, much bare area.

1	35216	Hedyotis megalantha rare	flowers dull white.
r	17	Rhynchospora occasional	~~c~~ small tufts
1	18	Scleria rare	
r	19	Cladium occasional	branched sparingly at base.
4	20	Saccharum spontaneum one clump seen on bare soil	clump 2 m. tall.

Plants seen:

a Casuarina equisetifolia
a Gleichenia linearis

Pioneers on eroded red clay only
Blechnum vulcanicum
Stenoloma
Hedyotis megalantha

One or two old Casuarina trees - little vegetation under them when ground is covered by needles.

150 m.

a Myrtella fennigeniana
a Melastoma malabathricum
c Hyptis capitata

1953 Guam

c Dimeria chloridiformis
c Miscanthus floridulus
c Pennisetum
lc Rynchospora rubra
lc Cladium
o Wikstroemia elliptica
o Genirostoma
o Paspalum orbiculare
o Rhynchospora ~~caespitosa~~ rubra
o Dianella
o Leucaena glauca
lo Pouteria
lo Cassytha filiformis
o Scaevola frutescens
r. Saccharum spontaneum
r Phyllanthus saffordii
r Blechnum vulcanicum
r Stachytarpheta indica
r Hedyotis megalantha
r Lindsaya ensiformis

Dec. 11 - 5 km. south of Agat.
2.5 km. east of Facpi Point
flat-topped erosion remnant
of deep red soil

35221 Scleria
plants solitary under
Casuarina trees

22 Rhynchospora rubra (Lour.) Makino
locally common

Plants seen on flat top: (pioneers on bare ground marked P)
a Waltheria indica
a Scleria (35221)
a Dimeria chloridiformis

r Flagellaria indica
r. Stenoloma
r Timonius
r Pandanus tectorius
r Scleria

Cult. in pots at
Tenjo Vista

Asparagus plumosus
Dahlia pinnata

110 m.

a fringe of larger
Casuarina trees, patches of
young ones.

caespitose.

a Casuarina equisetifolia P
a Melastoma malabathricum
a Miscanthus floridulus
a Myrtella bennigseniana

1953 Guam

la	Gleichenia linearis	P	
la	Lindsaya ensiformis	P	
c	Oenistoma		
c	Hyptis suaveolens		
c	Cheilanthes tenuifolia	P	
c	Cassytha filiformis		
c	Dianella		
lc	Heteropogon contortus		
lc	Rhynchospora ~~corymbosa~~ tuba		
lc	Andropogon brevifolius	P	
lc	Lycopodium cernuum		
o	Centella asiatica		
o	Phyllanthus safforddii		
o	Pandanus tectorius		

Dec. 12 Base of Orote Peninsula

35223	Avicennia	
	common around edges of salt water	
4 24	Desmanthus virgatus	
	rare in weedy low ground	

Dec. 12 - Base 18, Apra Heights

5 25	Ipomoea ~~cordata~~ cissicaulis (Benth.) Rob	
	Established outside of browsing area in volcanic soil.	

o	Chrysopogon aciculatus	P
o	Scaevola frutescens	
o	Dodonaea viscosa	
o	Hyptis capitata	
r	Tribulus	
r	Ipomoea littoralis	P

0 m.	small tree, 4 m. tall, leaves yellow
1 m.	erect suffrutescent herb 1.5 m. tall; flowers with stamens white.
90 m.	stems ascending, 1 m. tall, flowers lilac.

1953 Guam

Dec. 12 - 1 mi. s of Mt. Tenjo
large red soil erosion
remnant, volcanic soil.

35224 4 Spathoglottis
occasional in volcanic
soil and in coral gravel at
edges of road.

2 27 Morinda citrifolia L.
occasional in savanna

1 28 Flagellaria indica L.
rare in savanna

1 24 Euphorbia
rare on eroded spots

Dec. 12 - 3.5 km. S 45° W. of Camp
Witek -
large patch of Leucaena
with some Triphasia,
on a dark soil ~~on~~ on
a volcanic breccia with
some limestone fragments.
Opening with Paspalum
conjugatum, Stachytarpheta
indica, etc. In places
a forest growth of some
size has apparently
been cleared and burned,
as half burned logs are

35230 3 Bixa orellana L.
around old homesite

160 m.

flowers magenta-pink.

shrub 1.5 m. tall, flowers
white.

vine clambering in
low bushes.

erect, flowers white.

110 m.

lying around. In clearing
are planted bananas,
Colocasia (form with dark
purple petioles), Artocarpus,
Bixa, Bambusa, etc. This
cultivation appears to
have been relatively
recently, perhaps temporarily,
abandoned.

shrub 2 m. tall; flowers
pink.

Dec. 12 - 2.5 Km. w. of Togcha Bay

Open rolling land at headwaters of stream red-brown, probably volcanic soil. Last April a severe fire swept across the area. ~~Now~~ Now the area is occupied by Miscanthus about knee high, Stachytarpheta indica and Hyptis capitata as codominants, ~~with~~ locally varying in abundance, with significant amounts of Hyptis suaveolens, H. pectinata, Elephantopus mollis, and a little Pseudelephantopus spicata.

~~35231~~ Dec. 12 - Talofofo River, near mouth.

35231 Cassia
2 roadside on coral gravel.

Barringtonia racemosa swamp forest with standing water between trees. An axe or two of this present here, pure stand.

In ~~open~~ bare spots Chrysopogon aciculatus and Dimeria chloridiformis are common.

Around shallow headwater ravines are small forest patches of Calophyllum inophyllum, with some Pandanus, Hibiscus tiliaceus, etc. Clerodendrum inerme, Glochidion and much Triphasia make up the undergrowth. Nephrolepis around edges. ~~Many~~ Some epiphytes.

Many mosquitoes and some wasps.

rm.

erect, flowers yellow.

1953 Guam

Dec. 13 - Mt. Alutom

somewhat eroded
volcanic area
35°23L orchid
in open spot.

Study of surrounding country from top of peak - Evidences of an old deeply weathered surface to be seen in all directions. ~~from~~ The most obvious of these are in the form of actual tiny mesa-like fragments of the old surface itself, flat topped and with sharp, steep sides usually surrounded by bare red areas. Much greater in extent are flattish, gently rolling, gently sloping (away from alifan massif) somewhat degraded surfaces, usually grassy. In addition are rounded ridges of red soil usually more or less vegetated, and conspicuous bright red erosion scars.

Undoubtedly all of these except the first

300m



are subsequent surfaces from which much of the original material has been removed, (and in places, deposited in depressions).

The erosional characteristics of this material are such as to tend toward production of gently rounded to flattish surfaces, there of a dense fine red clay that seems to resist encroachment by vegetation so that bare soil is exposed for some time after active denudation.

Of the total exposed surface in sight perhaps 3/4 is of this nature, while more than half of the total area of land in sight is not of red soil. The 1/4 remaining bare surface includes hard rock outcrops on mountain tops and steep slopes, as well as erosion scars in tuffaceous or other soft or weathered volcanic material.

The distribution of Casuarina is quite general but very irregular. Pattern is not too clear, as it has been

U. S. GEOLOGICAL SURVEY
PROGRESS MAP

ISLAND OF GUAM

SCALE
0 1 2 3
MILES

N

RITIDIAN PT
ACHAE PT
PAJON PT
MACHANAO MT
URUNO PT
NORTHWEST FIELD
MERGAGAN PT
TARAGUE BEACH
TAGUA PT
PATI PT
POTTS JCT
HAPUTO PT
LAFAC PT
ANDERSEN AFB
HILAAN PT
SALISBURY JCT
WETTENGEL LOOP
TANGUISSON PT
MT SANTA ROSA
ANAO PT
AMANTES PT
MATI PT
WETTENGEL JCT
YIGO
BIJIA PT
DEDEDO
CATALINA PT
TUMON BAY
YPAO PT
HARMON FIELD
JANUM PT
SAUPON PT
LUMUNA PT
ADACAO
PAGAT PT
MT BARRIGADA
CAMPANAYA PT
AGANA BAY
LEARY JCT
COONTZ JCT
AGANA
TAMUNING
NAS AGANA
ASAN PT
CABRAS I
GLASS BREAKWATER
ASAN
PITI
MONGMONG
TOTO
BARRIGADA
SCHROEDER JCT
COM. MARIANAS
SINAJANA
TAGUAN PT
APRA HARBOR
ORDOT
USCC
OROTE PT
FADIAN PT
NAS OROTE
INNER APRA HARBOR
CHACHAO MT
ALUTOM MT
PAGO RIVER
LATES PT
HAPUTO PT
MT TENJO
PAGO BAY
YONA
PAGO PT
ROCKY PT
MANENGON RIVER
TAGACHAN PT
AGAT BAY
YLIG
YLIG BAY
SANTA RITA
YLIG PT
NAVAL AMMO DEPOT
BANGI PT
AGAT
MAPAO
TOGCHA BAY
ALIFAN MT
FENA
ANAE I
TALOFOFO
CAMP DEALY
ALMAGOSA MT
TALOFOFO RIVER
FACPI PT
MT LAMLAM
TALOFOFO BAY
JUMULONG MANGLO MT
BUBULAO
CETTI BAY
DANDAN
UMATAC
ASIGA PT
MT BOLANOS
UMATAC BAY
JALAIGAI PT
MT SCHROEDER
MT SASALAGUAN
PAULILUC BAY
BAY
INARAJAN
MERIZO
AGFAYAN BAY
ACHO PT
COCOS LAGOON
MANELL PT
AGA PT
FOFOS I
COCOS I

LEGEND

Mapping completed Date:

Geology Sq. Mi:
% of Island:

Soils Sq. Mi:
% of Island:

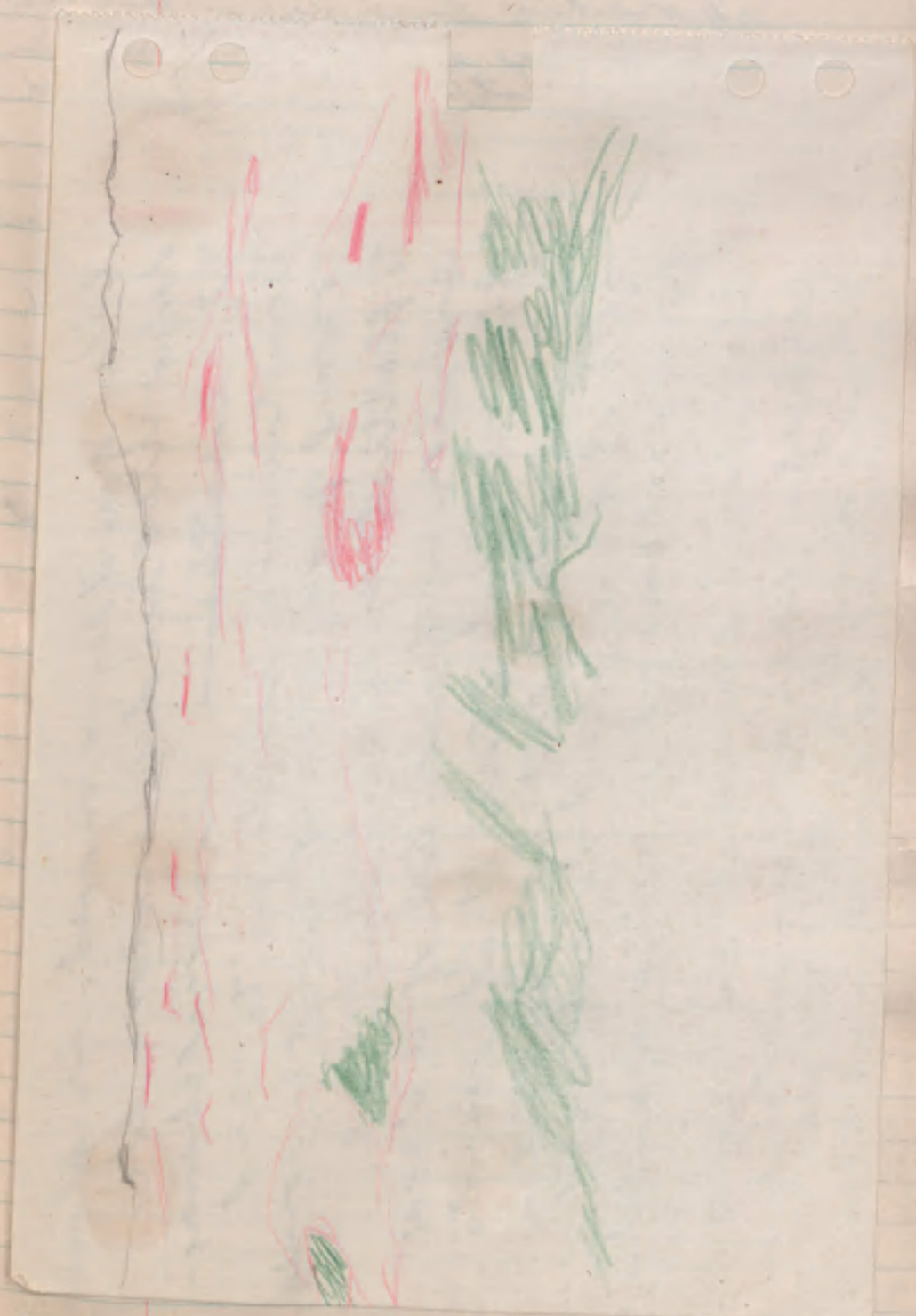
◎ Areas of special investigation
A Geology A Soils

1953 Guam

are subsequent surfaces
from which much of
the original materials
[illegible] removed (and



[illegible] very
irregular. Pattern is not
too clear, as it has been

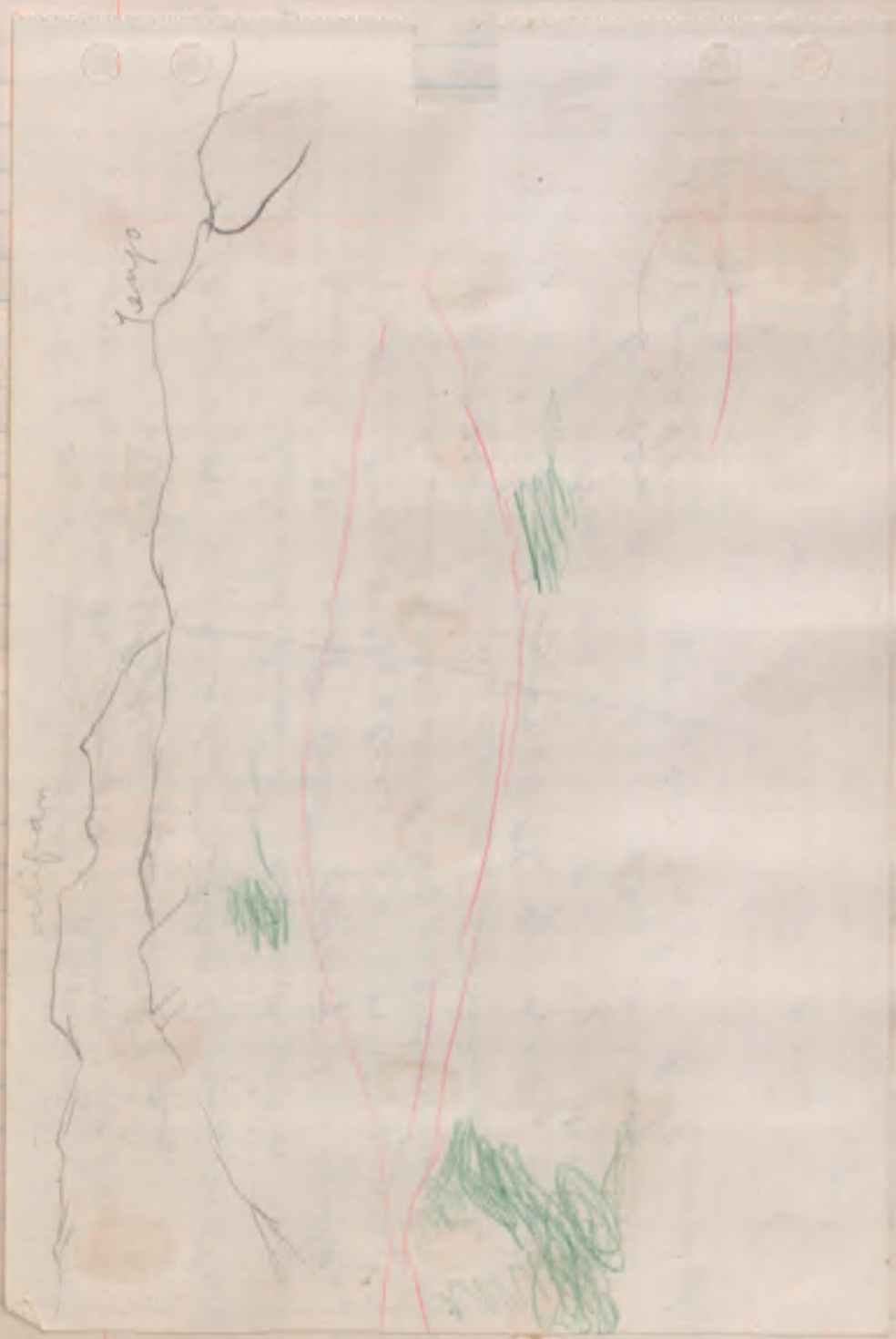


1953 Guam

much influenced by sporadic burning. However, saplings are less common on smooth grassy slopes and flats and much more common on ridges and rocky or broken ground. Only very locally is it abundant enough to form thickets.

Other forest seems confined to ravines and stream courses, but is not always present in these. Some apparently similar ravines to the wooded ones have strips of Phragmites in their bottoms and rather luxuriant Miscanthus or gleichenia on their sides. Some lack the reeds.

The herbaceous vegetation on the slopes varies, but seemingly with little relation to topography. Most common, of course, is practically pure Miscanthus varying in color at this season from brownish green to bright green. Surprisingly large areas, at least on gentler slopes, are covered by practically pure stands



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of Dimeria chloridiformis. These are a glaucous green in color, lower stature, and very fine texture. Patches of Glenheria are a bright green, finer texture than Miscanthus but the same color as the brighter green Miscanthus. These types are rather sharply set off, generally. Pure stands of reeds (Phragmites karka) occupy low spots and poorly drained areas as well as seepy places on slopes. Now in bloom, their usually bright green appears drab-green.

Dec. 13 - Mt. Tenjo

On east slope, just below crest, is a thick patch of Saccharum, 4-5 m. tall - an acre or more. Should be looked at for limestone outcrop.

Dec. 17 - Mt. Alutom

Area to ~~east~~ + north east of ~~Mt~~ peak.

This shows, from above, a very well defined variation from pure Miscanthus to pure Dimeria chloridiformis.

Closer examination shows more mixture than evident from above, but two well defined communities, one dominated by Dimeria, the other by Miscanthus - perhaps three, one by Dimeria, two by Miscanthus. Eroded areas in each are more varied.

Generally the Dimeria community is on the very gentle slopes and rolling ground, while Miscanthus dominates on practically all steep slopes, also in the low ground in the bottoms of shallow drainage courses.

Eroded rocky knobs and erosion scars in other surface are more

varied but have certain species characteristically.

Dimeria community - on either bright red a yellow ~~red~~ brown soil with darkened uppermost layer.

Dimeria chloridiformis completely dominant, irregularly loosely tufted, up to 4 or even 5 dm. tall, many tiny ~~bare~~ bare soil areas. Other species:

c Rynchospora rugosa ~~corymbosa~~
c Lindsaya ensiformis
c Cheilanthes tenuifolia
c Hyptis capitata
c Elephantopus mollis
lc Waltheria indica
lc Miscanthus floridulus
r Dianella
o Centella asiatica
o Stachytarpheta indica
o Casuarina saplings.

Erosion scars

c Myrtella benniqueniana
lc Mitracarpum
o Wikstroemia elliptica
o Blechnum vulcanicum
o gleichenia linearis
o Chrysopogon aciculatus
r Melastoma malabathricum

in addition to species mentioned above

Where there are dead Casuarina saplings either Stachytarpheta or ~~Dase~~ Miscanthus are dominant, suggesting that the Dimeria community is not just a result of burning.

Eroded ridge of reddish soil on fine tuff:

Mixed weedy growth, mainly Miscanthus, Myrtella, with some Dimeria, Lycopodium cernuum, Blechnum, Scaevola frutescens, Casuarina, Hyptis capitata, one plant of Wedelia biflora var. canescens.

Miscanthus community on steep slopes varies in density and admixture with other species. Dimeria is weakly developed there.

Tuff knobs (fine, gray) protruding above red surface: Miscanthus with weeds, Blechnum, Glochidion, Wedelia, Dryopteris, Gleichenia, Elephantopus mollis, a few very small Triphasia plants in rock crevices, Hyptis capitata, Stachytarpheta, Digitaria fuscescens.

(cont. p 150)

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Dec. 16 - 1.5 km. w. of Talofofo

clearing which has been burned, in mixed second growth woods.

35233 Alocasia
2 common on cleared slopes and in edges of forest.

6 34 Phyllanthus amarus Schum. & Th. det. G. L. Webster
common on bare ground

Dec. 17 - Agaña
Weedy very low ground near sea.

2 35 Hedyotis
2 36 Eclipta alba
5 37 Eragrostis
occasional
3 38 Cyperus
occasional
5 39 Corchorus
occasional

50 m. Woods with Ficus prolixa, Hibiscus tiliaceus, Areca catheu, ~~etc~~. Tiphasia, etc. on limestone soil.

stem erect, 0.5 m. tall, leaves up to 2 m., glossy, green, ~~many~~ ~~of~~ several axillary inflorescences, spathe ~~straw~~ ~~cream~~ color, spadix appendage cream color; sap milky, extremely irritating to wet hands.

G. L. Webster erect

1 m.

erect & decumbent; flowers white.
erect; rays white.
culms spreading to erect.

small tufts; culms erect, terete.
spreading much-branched herb, flowers yellow; stems and fruits reddish.

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Dec. 16, ~~15~~ Macajna Mt., just south of agaña

35240 palm
1 around old military installation, locally very abundant.

Dec. 16 Mt. Alutom

1 41 Digitaria ~~paaaaaaaaa~~ adscens crevices of weathered knob off ridge gray volcanic tuff

(ctd. from p. 148)
Miscanthus community in low places and watercourses - thick, 1.5 - 2 m. tall, almost pure stand, few other plants - one or two tall Leucaena bushes.

Generally, in this area pattern is - steep slopes, Miscanthus dominant, on gently ~~slopes~~ rolling land, Dimeria dominant, ~~aaaaa~~ low spots and water-courses, miscanthus luxuriant and dominant.

210
~~20~~ m.

erect tree, trunk ± 10 cm. thick, 5 m. tall, smooth, scars visible near top, ~~5~~ 3-6 cm. apart; panicles ~~at~~ axillary, 4-5 on tree at once; fruit immature. sheaths of lvs. barely surrounding stem at base, sinus V-shaped.

310 m.

erosion scars Mytella, Gleichenia and weeds dominant, on ridges more or less same, with more shrubs.

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km. E 30° S

Dec. 18 – 2.5 ~~N~~ 30° E of Sinajana

low hog-back ridges covered by Miscanthus – red-brown soil with abundant limestone fragments

35?42		Cheilanthes tenuifolia common in open spots
4		
1	43	Cyperus rare ~~sp.~~
4	44	Cantharospermum scarabaeoides common
6	45	Phyllanthus ~~simplex~~ virgatus Forst. f. common in open spots
1	46	Chrysopogon aciculatus very common in open spots
2	47	Rhynchospora ~~cogambosa~~ rubra (Lour.) Makino very local in thin spots in grass.
1	48	Fimbristylis common in this place.
6	49	Emilia javanica abundant very locally in very rocky spot
1	50	Selaginella on steep earth side of ravine
3	51	Tarea lentopetaloides occasional on slopes

This is an area mapped as argillaceous limestone. The topography is an old

soil pH surface 6.0

4-12" 5.5

30 m. (and then down 20' in drill hole nearby, ? then 5.0)

fronds erect

spikelets yellow-green

twisting over grass clumps.

erect to ascending

stems creeping close to ground, fruiting culm erect.

tufted

mostly past fruiting.

stems decumbent, up to 1 m or more long; flowers red.

very small plants, rdy, sem.

tuberiferous, stems and petioles erect, fruits and green leaves at same time on same plants.

karst topography, much worn down and deeply covered by soil (50' in

1953 Guam

hole drilled by Stensland and Mayo). In this local area fairly extensive areas are open and covered by Miscanthus, alternating with patches of Leucaena and of mixed second growth forest.

The composition in the Miscanthus areas is approximately:

a Miscanthus floridulus
a Hyptis capitata
la Elephantopus mollis
la Leucaena glauca
c Phyllanthus simplex
c Mitracarpum hirtum
c Chrysopogon aciculatus
lc Psidium guajava
lc Emilia javanica
lc Waltheria indica
o Chrlanthes tenuifolia
o Canthaospermum scarabaeroides
o Desmodium triflorum
o Euphorbia hirta
o Cassia sp.
o Alysicarpus vaginalis
o Fimbristylis sp.
o Ageratum conyzoides
o Ipomoea indica
o Phyllanthus niruri
o Morinda citrifolia

lo Tacca leontopetaloide
lo Corchorus
lo Stachytarpheta indica
r Centrum dicuncum
lo Cassia occidentalis
r. Passiflora foetida

There are limestone fragments mostly cobble size, some larger, scattered abundantly on the surface of the ground. The limestone, though often preserving the coral structure or pattern, has all been recrystallized.

Part of the area has been burned over fairly recently. Here the Miscanthus is about 3 dm. tall and secondary species are fairly general. Another part has not recently been burned and the secondary species are scarcer, mostly on ridge tops. Hyptis is 1 m. tall & burned part, but in bloom. On unburned it is 2 m. tall.

This area of Guam, is the part of the Mariana limestone called the Argillaceous, apparently bears no original vegetation except perhaps these Miscanthus patches and they are very doubtfully so. The present vegetation is an intricate mosaic of patches of Leucaena glauca,

Dec. 19, - Tamuning

35252 Trichloaena rosea Nees
small colony in weedy place around Public Works installation.

Dec 19 - Experimental Farm Dairy, Barrigada

4 53 Achyranthes
abundant locally in pasture, not grazed even by goats

Dec. 18-19 (ctd. from above)
These, in places, seem to be being shaded out by Leucaena. In others they have been turned to pasture. This is dominated by Paspalum conjugatum, P. orbiculare, and Panicum

pasture, coconut plantation, thickets, cultivation, etc. Small farms are scattered through it. The soil in ~~patches~~ is deep and sticky, impervious and with mud-holes and marshes here and there. Patches of Miscanthus may once have been more common, as there are tiny remnants now. (ctd. below)

15 m

culms erect, spikelets scarcely pinkish.

50 m.

extensively branching herb spreading widely, compact, 1 m. tall; flowers purplish.

purpurascens; in places badly invaded by Stachytarpheta and, occasionally, achyranthes.

The dark brown to yellowish brown soil here contrasts sharply with the red soil of the border

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limestone just to the east.

The common woody species in this area are:

Artocarpus altilis
Leucaena glauca
Cocos nucifera
Pithecellobium dulce
Bambusa vulgaris?
Hibiscus tiliaceus
Mangifera indica
Moringa oleifera
Cestrum diurnum
Carica papaya
Triphasia trifolia
and (not woody)
Musa sapientum

1953 Guam

Dec. 20 - near Talisay, 2.9 km 15° s. of e. of Apra Heights eroded hills of decomposed volcanic material.

35254 Emilia javanica (Burm. f.) C.B. Rob. common, especially on eroding scars and burned places.

1 55 orchid rare on steep slope in wind-gap

1 56 Phyllanthus ~~simplex~~ V virgatus rare on bare shots on ridges and steep slopes

2 57 Curcuma small colony on very steep slope in wind gaps.

1 58 Hibiscus abelmoschus occasional locally in recently burned area

4 59 Dryopteris abundant in recently burned area

1 60 Fimbristylis schoenoides var. foenea (Kük.) occasional in grass

2 61 Fimbristylis occasional in grass

3 62 Ipomoea pes-caprae along edge of road where coral gravel has been spread.

5 63 Piper grahamense abundant in undergrowth in wooded ravine.

150 m. Limestone fragments mixed with volcanic in breccia.

stems decumbent & erect; flowers red.

erect

Forst f.

sterile; rhizome deep orange within.

very small plants only; flower yellow with maroon center.

Fosb.

forming large mat, flowers purple.

weakly woody plant 2-3 m. tall, like fruit red, fleshy; odor of broken parts somewhat like anise.

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35764 Piper quahumense
4 same

1 65 Freycinetia Toreiana
common in undergrowth
in wooded ravines

5 66 Premna obtusifolia R. Br. (obtusa Lvs.)
one tree in wooded ravine

2 67 Geniostoma micranthum var. micranthum
occasional in wooded
ravine.

1 68 Taeniophyllum
occasional on branches
of trees in wooded ravine

2 69
common in wooded ravine

4 70 Calopogonium mucunoides
large patch along road

This area consists of a rather sharply dissected group of ridges of somewhat weathered breccia, lapillar with many coarser fragments including some of limestone - a compact limestone said to be

♂ ~~same~~ weakly woody plant 2-3 m. tall, odor of broken parts somewhat like anise; spikes white, erect.

liana, climbing on tree trunks, bracts bright orange ~~at base~~ except for green tips.

tree 10 m. tall, herbage aromatic when broken; flowers pale green.

tree 4 m. tall branches mostly erect; flowers white.

roots fleshy, pale green, flattened and adhering to bark; stems vine climbing in trees; bracts deep red-purple, on leafless parts of stem.

comparable to that on Alifan and Lamlam. How much of this limestone is present in proportion to the total rock is uncertain.

The vegetation is mainly a complex of areas of Miscanthus and of Dimeria, with

1953 Guam

patches of woods in draws and ravines. Part of it has been burned recently, the other may have been burned long enough ago that obvious signs of burning have disappeared, but the Miscanthus is still quite low.

In the unburned part the pattern is, in general, ridges weedy, mainly Chrysopogon; steep slopes rather thin and bunchy Miscanthus gentler slopes and flatter, plateau Dimeria chloridiformis and associated species. There are a very few scattered Casuarina saplings, few enough to indicate a post-war fire.

Species found on ridges and slopes not recently burned:

a Miscanthus floridulus
la Chrysopogon aciculatus
la Dimeria chloridiformis
c Hyptis capitata
c Phyllanthus saffordii
c Hyptis suaveolens

lc Elephantopus mollis
lc Emilia javanica
lc Wedelia biflora var. canescens
lc Scaevola frutescens
lc Myrtella benigsenana (scan)
lc Gleichenia linearis (scan)
lc Glossogyne tenuifolia (scan)
lc Rhynchospora aurea
lc Desmodium triflorum
lc Centella asiatica
o Glochidion marianum
o Lobelia sp.
o Euphorbia hirta
o Waltheria indica
o Cheilanthes tenuifolia
o Mitracarpum hirtum
o Fimbristylis sp.
lo Abrus precatorius vaginalis
lo Cassytha filiformis
l Curcuma sp.
l Phyllanthus simplex
r Psidium guajava (tiny shrubs)
r Euphorbia serrulata
r Decaspermum fruticosum
r Stachytarpheta indica (on ridge scar)
r Melastoma malabathricum
r Dianella (on scars)
r Lygodium scandens (scan)
lc Lindsaya ensiformis (on scars)
r Wikstroemia elliptica

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On slopes below this, near edges of forest in draws, Hawks. Melastoma, Lygodium and Wikstroemia become very abundant; Blechnum vulcanicum, geniostoma, cycas, and Morinda appear.

On a large burn scar, fairly recent, the composition is:

a Miscanthus floridulus (low clumps, sparse)
a Hyptis capitata
~~Elephan~~
a Mitrasacme pilosa
a Lindsaya ensiformis
la Cassia javanica
la Dryopteris
c Elephantopus mollis
c Hyptis suaveolens
o Scaevola frutescens (sprouts from burned bushes)
o Hibiscus abelmoschus
o Waltheria indica
c Cheilanthes tenuifolia
la Dimeria chloridiformis

---

o Geniostoma
o Psamma obtusifolia
r Gossypium barbadense

In bottoms of wet ravines and draws are communities of pure Phragmites vulgaris.

These give way in spots to patches of Hibiscus tiliaceus. Associated with this are:

a Triphasia trifolia
a Piper guahumense
c Dryopteris sp
c Nephrolepis hirsutula
o Pandanus tectorius
c Lygodium scandens
o Centotheca lappacea
o Oplismenus compositus

In a patch of woods the composition is roughly:

a Hibiscus tiliaceus
a Triphasia trifolia
c Piper guahumense
a Dryopteris
a Nephrolepis hirsutula
c Pandanus tectorius
c Cyrtandra cicindalis
c Pouteria
c Oplismenus compositus
c Freycinetia torreziana
c Asplenium (tall)
c Medinilla rosea
o Ficus prolixa
o Morinda citrifolia

Dense, tangled, vine-covered, especially by Triphasia

1953 Guam

Labanan

Dec. 22 - Pagat (Marbo)

Degraded mixed forest on limestone

3, 5 271 Morinda umbellata var. uncommon — woody vine, climbing in trees.

5 72 Nephrolepis acutifolia occasional, epiphytic — fronds pendent, mostly sterile. "chacha"

2 73 Asplenium occasional, epiphytic

zone - young second-growth scrub, 2-4 m. tall, (less than 5 years old)

5 74 Lepturus repens v. repens subulata Forb. in openings along road — forming a loose mat

6 75 Canavalia megalantha Merr. local. — vine, climbing in scrub; flowers old-rose color.

3 76 Panicum purpurascens local in openings and edges of scrub — tangled, up to 1.5 m tall.

3 77 Fimbristylis local in openings on very thin soil. — densely caespitose; leaves stiff.

Large area between Marbo Military Establishment and cliffs that on 1948 photos was completely bare, is now covered by an uneven scrub 2-4 m. tall, difficult to walk through, but with small openings. This has a few scattered large trees, Pisonia and Intsia, but these not in good shape.

The soil is very thin, red, and with rough limestone showing through.

150 m.

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The composition of the scrub is roughly:

a Hibiscus tiliaceus
a Pipturus albidus
a Cestrum diurnum
c Pandanus tectorius
c Premna obtusifolia
o Morinda citrifolia
o Ochrosia oppositifolia
o Psychotria marianum
o Flagellaria indica
o Pisonia grandis
l Canavalia
r Piper guahamense
r Aglaia marianen
r Glamia marianensis
r Intsia bijuga
r Cynometra bijuga
r Caesalpinia
r ~~Mayt~~ Maytenus
r Eugenia ~~sinuosa~~ reinwardtiana

composition of herbaceous cover in openings:

la Leptaena repens
la Nephrolepis hirsutula
la Fimbristylis obtusifolia
la Stachytarpheta indica
c Chloris inflata
c Cenchrus echinata
o Euphorbia heterophylla
o Lida acuta
c ~~Pan~~ Polypodium scolopendria
o Boerhavia mutabilis

lo Asclepias curassavica
l Eragrostis amabilis
l Panicum purpurascens
l Ipomoea indica
r Cassytha filiformis
r Passiflora foetida
r Achyranthes aspera

A few areas have taller scrub or scrub forest, 6-8 m. tall but uneven. Same composition but with more Pandanus, Eugenia and Morinda, less Hibiscus and Cestrum, and with Cycas and Triphasia added.

Southof this area is a patch of forest that has been degraded somewhat, so it is very uneven, but probably never has been cleared, at least in recent years. This has an uneven undergrowth, largely of Cycas and tree seedlings. Its composition is, roughly:

a Artocarpus altilis
c Cycas circinalis
c Ochrosia oppositifolia
c Premna grandis

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c Elaeocarpus
c Aglaia mariannensis
c Cestrum diurnum
c Guamia mariannensis
c Carica papaya
c Eugenia reinwardtiana
c Cynometra bijuga
o Maytenus
o Pandanus dubius
o Triphasia trifolia
o Dioscoreae argenteus
o Pipturus ~~albidus~~
o Morinda umbellata
c Flagellaria indica
c Nephrolepis hirsutula
o Pyrrosia (sp.)
o Nephrolepis acutifolia
c Asplenium nidus
o Polypodium

Nephrolepis acutifolia "chacha" used by natives for garlands and decorations.

1953 Guam

Dec. 25 - 1 km. s.e. of Barrigada

35278 5 Zizyphus jujuba — 65 m.
single tree by roadside on limestone soil, open woods. — small tree 5 m. tall. flowers pale green.

Dec. 25 - 1.5 km. s.e. of Barrigada — 65 m.

1 79 Cyperus — small tuft. dark green.
in ravine bottom on limestone soil, in woods

Dec. 25 - 1 km. s. of Barrigada — 65 m.
in low scrubby secondary forest on limestone soil

5 80 Ipomoea indica (Burm.) Merr. — twiner, flowers violet, fading at 3 p.m. small tufts, dark green.
climbing over bushes

4 81 Cyperus
in open grassy spots

4 82 Sporobolus
common in open grassy spots

1 83 Cyperus compressus
rare in open grassy place

1 84 Ximenia americana L. — shrub 1.5 m. tall; sterile.
rare in bushy area

1 85 Cyperus kyllingia — heads white.
rare in open grassy place

3 86 Annona — spreading tree 6 m. tall; fruit not quite ripe.
common

6 87 ~~Ipomoea~~ Stictocardia tiliifolia (Desr.) Hall f. — extensive woody twiner, flowers magenta, deeper in center, throat narrow campanulate, flaring, anthers sligatly curved, white.
common climbing in trees

35788 Averrhoa bilimbi ? L.
rare in opening — slender shrub 2 m. tall, sterile.

6 89 Moghania strobilifera (L.) R.Br.
local in scrub — shrub 2–3 m. tall

5 90 Cassia
abundant in open flat raving bottoms.

2 91 Annona muricata
rare. — small tree 6 m. tall, sterile.

Dec. 23 – base of Orote Peninsula

92 Saccharum spontaneum
occasional on low flat open ground — large clumps 2.5 m. tall, few panicles, all old and shattered.

The soil here is coral sand, but must represent fill material, as when bored with an auger to ± 75 cm. the auger brings up soil with a very strong H_2S odor.

Dec. 25 – San Ramon Chapel area, 1–1.5 Km. s. to s.e. of Barrigada.

This is a part of the area of the argillaceous member of the Mariana limestone (Pliocene?), with irregularly dissected terrain, relief about 30–40 m. This terrain seems to be an old, much weathered karst topography, perhaps with sink holes connected and with drainage no longer downward, as the openings have been ~~covered by a~~ filled by an impervious clay, probably derived from the volcanic material contained in the argillaceous limestone. It now has intermittent streams, leaving pools between rains. The ridges are now

weathered so they are broad and rounded on their tops.

The area to the south of Barrigada is covered by a scrub or thicket 3-4 m. tall, usually continuous, with scattered coconut trees.

Composition roughly:

a Cestrum diurnum
c Morinda citrifolia
c Pithecellobium dulce
c Leucaena glauca
c Triphasia trifolia
c Annona sp.
~~o Barringtonia racemosa~~
o Psidium guajava
c Carica papaya
la Moghania strobilifera
r Cananga odorata
r Melanolepis multiglandulosa
r Ximenia americana
c ? Ipomoea
c ? Ipomoea indica

In openings are

a Chrysopogon aciculatus
c Stachytarpheta indica
a Cassia sp.
c Sporobolus elongatus
c Alocasia macrorhiza
o Cyperus ligularis
o Acalypha indica
o Passiflora foetida
o Cyperus sp. ? Cyperus compressus

The wooded aspect of this 1-1.5 km. s.e. of Barrigada seems to occupy steeper, more deeply cut terrain. Here ~~Bo~~ Artocarpus and Cocos make up ~~the~~ an irregular upper story about 20-25 m. high, with an incomplete canopy. An irregular second story is 3-10 m. high. The ground layer is also incomplete and about 1 m. high.

Composition:

Tr. Bot. (a Artocarpus altilis
a Cocos nucifera
2nd story c Hibiscus tiliaceus
c Cananga odorata
c Triphasia trifolia
e Carica papaya
r Ochrosia oppositifolia
r Pandanus dubius
r Annona muricata
o ? Ipomoea (climber)
Ground layer o Cestrum diurnum
o Morinda citrifolia
a Piper quahumense
c Alocasia macrorhiza
c Urena lobata

Epiphytes are present in some

1953 Guam

abundance
la Pyrrosia
c Davallia solida
c Polypodium scolopendria
o Polypodium (bases of coconuts)
r Freycinetia lorenziana
(epiphyte?)

In this area talked to a Guamanian who owns some land. He said that since the invasion his coconut trees have been attacked by a disease and of his 400 trees only about 30 are still producing nuts. Many are dead, many look rather bad, ~~strongly~~ trunks strongly tapering toward the top. Many seedlings seen, but no young trees coming into bearing. The man says that young trees are attacked also. Nuts produced are very small 30 trees ~~do not~~ produce enough to feed his 150 chickens, so he must buy scratch feed.

(2-3 km. n.w. of)
Dec. 24 - Back of Yona - ~~the~~ the limestone area here seems to compare well with that south of Barrigada, both in topography and vegetation. Breadfruit and bamboo conspicuous, Leucaena very abundant.

Transition to volcanic soil gradual, with Leucaena very abundant on ridges, a mixed forest in ravines.

Eroded volcanic terrain about ½ m. w. of Yona has been recently disturbed, mainly by fire and military activity. It is quite patchy. Bright red soil.

Relatively undisturbed parts have:
a Miscanthus floridulus
a Phyllanthus saffordii
c Waltheria indica
c Elephantopus mollis
o Wikstroemia elliptica
o Glochidion marianum
o Hyptis capitata

Casuarina common only in one area - which probably indicates the only unburned patch.

1957 Guam

In scars:

a Miscanthus floridulus
a Chrysopogon aciculatus
a Gleichenia linearis
c Dimeria chlridiformis
c Waltheria indica
c Elephantopus mollis
lc Clerodendrum inerme
o Dianella
o Blechnum vulcanicum
o Hyptis suaveolens
lc Cuneuligo
o Melastoma malabathricum
o Glossogyne tenuifolia
o Jacca leontopetaloides
r Cycas circinalis

Sm patches are dominated by Stachytarpheta, Chrysopogon, Hyptis suaveolens, H. capitata. Here are found scattered Leucaena and Morinda bushes. & considerable Caesythia, Waltheria, Mitracarpum, patches of Pennisetum polystachyum, locally Eychlodrum cernuum and Rynchospora corymbosa. The two latter are in patches of sparse Miscanthus, rather than in the Stachytarpheta.

The last flat-topped remnant to the east, perhaps 1 mi. w. of Agana, is very small, covered by Miscanthus 2 m. tall, to the exclusion of everything else except 2-3 small Indigofera bushes. A few other thing on the crumbling edges.

This is surrounded by a terrace 10 m. or more below, 100 m or less wide. This may coincide with the ancient shore-line of the Mariana Sea when the argillaceous limestone was laid down. A deposit of a conglomerate of somewhat rounded (probably not much so originally) volcanic pebbles and cobbles, exposed here by a ravine cut.

An almost level surface, probably corresponding to this terrace but somewhat eroded off, recently burned supports a vegetation of:

1952 Guam

a Miscanthus (low, sparse)
a Stachytarpheta indica
a. Hyptis suaveolens
la H. capitata
la Chrysopogon aciculatus
la Elephantopus mollis
a Mitracarpum hirtum
c Phyllanthus virgatus
l Mereremia
l Ipomoea
lc Dimeria chloridiformis
or sem (lc Gleichenia linearis

On a slope of an exposed tuff knob, just above a rather flat wooded and cultivated area, is dense Miscanthus 2 m. tall with small openings that probably represent old erosion scars, some still with bare soil. The scars have Scaevola, Chrysopogon, Elephantopus mollis, Nephrolepis hirsutula, Waltheria, Hyptis pectinata, Urena, Stachytarpheta, Hyptis capitata, Indigofera, Fimbristylis, etc.

Just below this is a black soil, wooded with

thickets of Triphasia. Beyond there is an open banana plantation on dark red-brown soil. This is scattered with fragments of limestone of several sorts, tuff, etc. May suggests that this may represent the old shore-line of the Mariana sea, also, because such an accumulation might be expected on a beach. The terrace like topography, with a rather abrupt scarp supports this idea.

Beyond the plantation on the same gently sloping terrace, leading down into a shallow ravine, is a forest of

c Cerbera dilatata
c Areca catheca
c Cestrum diurnum
c Melanolepis multiglandulosa
c Hibiscus tiliaceus
c Leucaena glauca
c Triphasia trifolia
c Hernandia sonora
o Glochidion
o Pandanus dubius
o Pandanus tectorius
o Morinda citrifolia

1953 Guam

o Clerodendrum inerme
o Carica papaya
with climbers
c Mikania scandens
a Ipomoea indica
and epiphyte
c Pyrrosia lanceolata

Around the nose of
a broad ridge. The continu-
ation of this is
dominated by
a Pandanus tectorius
c Cerbera dilatata
o Hernandia sonora
r Pouteria
(These seem only from
distance, lower species
could not be separated)

The roads in the
volcanic area above
this are surfaced with
crushed coral and
are marked by strips
of Leucaena.

A very small patch
of woods in a shallow
draw has
la Areca catheca (grove)
c Pandanus tectorius
c P. dubius
c Triphasia trifolia

o Cycas circinalis
ground layer of
a Kalanchoe (tall)
c Centotheca lappacea
c Oplismenus compositus
o Flagellaria indica
lc Oplismenus undulatifolius
(edges)

A ravine forest seen
only from above, has
Pandanus tectorius
Ficus prolixa
Cocos nucifera
Hibiscus tiliaceus
Areca catheca
Artocarpus altilis
Cycas circinalis
Triphasia trifolia.

The ravine type,
characterized largely
by Areca and Ficus,
seems to merge with
the secondary wood
of the argillaceous
limestone.

1993 Guam

Dec. 24 – 2-3 km. n.w. of Yona
west of edge of limestone
on volcanic soil

35293 Mikania scandens L.
5 in mixed forest

4 94 Merremia hederacea (Burm f.) Hall. f.
on bare flat volcanic soil

~~93~~

4 95 Ipomoea
on bare flat volcanic soil

~~96 Rhaphidophora~~

5 96 Phyllanthus simplex
common in thin places,
especially burned over areas.

4 97 Scleria
occasional locally in
thin places in grass

1 98 Liparis guamensis?
rare in thin places in grass

5 99 Ophioneuron undulatifolium (Ard.) R+S.
in edges of patch of
forest on volcanic soil.

35300 Rhaphidophora
4 very abundant locally
on flat areas of exposed
weathered gray tuff.

Dec. 26 Dededo

01 Lantana camara L.
locally on large patch.
on limestone soil

100-130 m.

vine climbing in trees.
– flowers white.
prostrate, flowering
branchlets erect, flowers
— yellow, open at 3 p.m.
prostrate, flowers
purple, faded at
3 p.m.

erect, bulbs white;
– flowers flesh color.
prostrate, forming
loose mat.

erect or spreading;
flowers purplish.

100 m.

luxuriant bushes, 1.5-2
m. tall, fls. yellow,
turning pink; fruit
lead-blue.

Only one specimen of
no 35305 found. This
distributed to US.

cl Junction

coral
, wet place
2 L.
dant
bnatum

down and
hunch

common

05 Jatropha multifida L.

1 06 Dentella repens
in shade of buildings

2 07 Malvaviscus

2 08 Phyllanthus nivosus

3 09 Mitracarpum
abundant weed in open ground

2 10 Solanum nigrum L.
common weed in open ground

80 m.

slightly tufted or
solitary culms.
slightly tufted.

100 m.

flowers bright orange.

shrub 2 m. tall,
inflorescence and
staminate flowers
bright coral red,
ovaries green; latex
watery. "Santa Ana"
prostrate, flowers
white.
shrub 1 m. tall;
flowers scarlet,
never opening.
leaves purple & white,
shrub 1.5 m. tall,
branches arching.
flowers white

erect, flowers white.

PLANTS OF THE MARIANAS ISLANDS
GUAM

Jatropha multifida L.

Locality Dededo

Occurrence cultivated in dooryard

Date Dec. 27, 1953 Alt. 100 m. (map)
Coll. F. R. Fosberg No. 35305

Remarks Shrub 2 m. tall, inflorescence and staminate flowers bright coral red, ovaries green; latex watery. "Santa Ana"

Pacific Vegetation Project

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Pacific Vegetation Project

Only one specimen of
no 35305 found. This
distributed to US.

1953 Guam

Dec. 27 - Wettengel Junction

roadside in coral limestone soil, wet place

35302 Cyperus odoratus L.
locally abundant

6 03 Paspalum fimbriatum
occasional

Dec. 27 - Dededo

cultivated in dooryard

4 04 Cosmos sulphureus
common

05 Jatropha multifida L.

1 06 Dentella repens
in shade of buildings

2 07 Malvaviscus

2 08 Phyllanthus nivosus

3 09 Mitracarpum
abundant weed in open ground

2 10 Solanum nigrum L.
common weed in open ground

80 m.

slightly tufted or solitary culms.
slightly tufted.

101 m.

flowers bright orange.
shrub 2 m. tall, inflorescence and staminate flowers bright coral red, ovaries green; latex watery. "Santa Ana"
prostrate, flowers white.
shrub 1 m. tall; flowers scarlet, never opening.
leaves purple & white, shrub 1.5 m. tall, branches arching.
flowers white

erect, flowers white.

1953 Guam

Dec. 27 - 1 mi. n. of Dededo

33311 4 Hyptis pectinata
common in fallow clearing
on limestone soil.

The country just
north of Dededo is
broken into clearings,
patches of scrub
which are really
abandoned clearings,
and patches of wood
which still contain
fair sized trees. It
seems to be being
actively opened up
at the present time,
with one or two new
roads.

110 m.

very aromatic erect
herb 1-1.5' m. tall;
flowers lavender.

1953 Guam

Dec. 28 - 1 km. n. of Fena River Dam,

35312 Gymnosa Gonocephalum crepidioides
4 occasional on freshly
stirred up limestone debris
in full sun.

Dec. 28 - e. slopes Mt. Alifan

6 13 Chloris radiata
very common on recently
cleared and filled roadside,
limestone soil.

Dec. 28 - Alifan - Fena Basin
Area.

Forests on Alifan limestone
sharply set off from the
ravine forests, even
where they approach very
closely, by the presence of
"dugdug" (Artocarpus altilis
var.) in the former and
presence of Areca in latter.
Pandanus, esp. P. dubius,
an important component
of both, esp. the Alifan.
On the Bona limestone in
the basin the forest seems
to be that of the ravines
rather than of the Alifan,
even where the altitudes
do not differ much.

50 m. heads red.

250 m.

The Magas Sabang
area seems, from a
distance, to be completely
covered by coconut plantations.
The Cananga odorata
forest in the vicinity
of the Fena Dam are
an aspect of the ravine
type.

The volcanic material
in this region, mainly
the Bolanos Formation,
is in many or most places
strongly contaminated
by limestone fragments
embedded in the breccias.
This material, on slopes
and upland flats, bears
sword-grass, in lower
spots and ravines is forested.

1953 Guam

Dec. 29 - n.e. slopes of Mt. almagosa weathered volcanic material ±50 m.

35 3 14 Paspalum
occasional on bare soil

3 15 Emilia ~~sonchifolia~~ javanica (Burm. f.) Rob.
common on bare soil
— flowers red, well exserted from involucre.

3 16 Emilia sonchifolia (L.) D.C.
common on bare soil
— flowers lavender, only slightly exserted from the involucre.
— erect herb 1.5' m. tall.

7 17 Conyza bonariensis
common in damp excavation

4 18 Buddleia asiatica L.
local in excavation
— shrub 2.5' m. tall,
— flowers white.

2 19 Setaria
local along roadside in crushed limestone.

3 20 Paspalum
common in moist excavation
— small tufts, culms erect & ascending

Dec. 29 - s.e. slope of Mt. Alifan ±50 m.

21 Fimbristylis
on small patch of limestone

This is a small patch of "Alifan limestone" well below the main mass of this formation on a slope composed principally of Bolanos breccias and pyroclastics. The general slope is principally covered by Miscanthus. The limestone outcrop, deeply pitted, has apparently been deforested in recent years. It is now covered by a mixture of scrub and Miscanthus, growing directly on limestone. (over)

1953 Guam

Dec. 29 east slopes of Mt. Alifan

small wet ravine, partially blocked by road construction

35 322 Acrostichum aureum
2 in mud

5 23 Rhynchospora
in mud.

(ctd. from 197) rooted in small soil pockets. None of the associated species ordinarily with Miscanthus were found (except possibly the Fimbristylis). Species found on this limestone:

Miscanthus floridulus
Pandanus dubius
Pandanus tectorius
Ficus prolixa
Hibiscus tiliaceus
Cestrum diurnum
Triphasia trifolia
Calophyllum inophyllum
Melinda citrifolia
Nephrolepis hirsutula
Chrysopogon aciculatus
Fimbristylis
Ptyptis pectinata
Pennisetum polystachyum

700 m.

clumps, 2 m. tall,

culms erect, 1 m. tall or more.

It was noted that on these Bolanos slopes the herbaceous vegetation seemed to be almost pure Miscanthus. Although Dimeria is here in small amounts, nowhere was seen any association dominated by it.

It may be that only on the elevated land to the north of Talofofo Valley ~~is~~ there any Dimeria association. This may tie with the ancient history of the area. The Fena Basin and lands south of it may have been under water while the argillaceous limestone was laid down, while the red weathering surface was

developing on the block
north of the Taloforo.

A ravine forest seen
from a distance, on the
s.e. slope of alipas
hill

35
2
5

a Hibiscus tiliaceus
a Pandanus dubius
a P. tectorius
o Calophyllum inophyllum